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DREAMSTIME/ZIGZAGMTAR



TOM THULEN; BELOW: SUPERSTOCK/CITIZEN OF THE PLANET



BELOW: HANNAH KINCAID; RIGHT: FOTOLIA/TONY CAMPBELL





MORE THAN A MAGAZINE ... A WAY OF LIFE

Cover Story

Tips and Techniques for Water-Wise Gardening

Tap these efficient watering systems to save on your water bill while still growing food despite drought and heat.

Features

The Multiple Benefits of Grass-Fed Meat

Grazing ruminants play an important role in maintaining our health and protecting the environment. Give those animals grain in feedlots, however, and these health benefits become health risks.

25 Fresh Ways to Put Extra Food to Good Use

Don't scrap your scraps! Reduce food waste by transforming your leftover morsels into meals.

A Top Storage Crop: Get to Know Winter Squash

Plant now to stock your winter pantry with creamy buttercups, delectable delicatas and nutty acorns.

Nifty Potting Bench Plans

Build a convenient, in-garden work surface, complete with storage space for small tools and supplies.

The New Urban Agriculture

Farmers inside city limits are growing a lot more than food—they're also cultivating change.

Gardener's First Aid: What Works and Why

Follow these simple, safe and effective remedies for soothing sunburns, blisters, bug bites and other minor maladies.

The Right Utility Vehicle for Your Homestead

These versatile, dependable machines make all sorts of country chores easier.











MORE THAN A MAGAZINE ... A WAY OF LIFE

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EarthWords

Zoraida Rivera Morales

MOTHER EARTH NEWS (ISSN 0027-1535) is published bimonthly, six issues per year, by Ogden Publications Inc.; 1503 SW 42nd St.; Topeka, KS 66609. Periodical postage paid at Topeka, KS 66609, and at additional mailing offices. Subscriptions: \$19.95 for one year in the United States and its provinces; \$27.95 per year in Canada and \$31.95 per year foreign, prepaid in U.S. funds. (CANADA GST NBR. 89745 1720 RT0001). Postmaster: Send changes of address to MOTHER EARTH NEWS; 1503 SW 42nd St.; Topeka, KS 66609-1265 or call 785-274-4300 or 800-234-3368. Outside the U.S., addits to HOTHER LARTH NEWS 100 SW 421d St; Topeda, No 500097-1203 SW 421d St; Topeda, SW 500097-1203 SW 421d St; Topeda, SW 500097-1203 SW 5

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Seed-Sharing Snafu

id you know that in some states informally sharing seeds with your fellow gardeners is illegal? Hard to believe, but it's true.

To ensure that seeds sold to farmers and gardeners are of good quality, every state has laws that require people who sell seeds to buy a permit and label their seeds with the variety name, germination percentage, presence of weed seeds, name and address of supplier, and more. Sounds OK, right? You've seen all of that information on the seed packets you buy. But in some states, seed-labeling laws define "sell" to include give away, transport, and even "possess with intent to ... give away, or transport." That's right—you need a permit from the state to legally give away seeds.

Minnesota's seed law, for example, is so broad that it basically prohibits gardeners from sharing or giving away seeds unless they buy an annual permit, have the germination of each seed lot tested, and attach a detailed label to each seed packet. This law is enforced by the Minnesota Department of Agriculture, which has recently told seed libraries that they can't distribute free seeds to gardeners unless they buy a permit and provide detailed labeling, even though the libraries aren't selling the seeds. (The penalty for violating this law, by the way, is a fine of up to \$7,500 per day!)

The creation of seed libraries to facilitate seed sharing and preserve seed diversity has been spreading, with an estimated 300 libraries now operating nationally. Officials in several other states are now saying that the libraries can't give away or exchange seeds unless they first obtain a permit and comply with the numerous requirements of the seed-labeling law. Needless to say, these actions have upset many gardeners who know the value of saving and sharing seeds that are highly adapted to their local conditions. Regulating seeds that are sold commercially is one thing, but applying such laws to seeds that are swapped or given away defies logic, history and common sense.

Neil Thapar, staff attorney at the Sustainable Economies Law Center (SELC), has reviewed the laws in more than 30 states so far, and he reports that about 30 percent of them specify that sharing seeds without a permit is illegal. Almost all the laws contain vague language that needs to be clarified to explicitly exempt noncommercial seedsharing activities, he says.

A national group, the Association of American Seed Control Officials (AASCO), has produced what's called the Recommended Uniform State Seed Law. Even this model legislation appears to require permits for any seeds "transported" within a state, however,

Saving and sharing seeds is an ageold practice that should be encouraged. Given the challenges we face from climate change, we need to promote-not impede—the distribution of locally adapted farm and garden seeds. This issue may not seem like a big deal to seed-control officials, but it is a very big deal to thousands of home gardeners. AASCO should move quickly to revise its model law to exempt all forms of noncommercial seed sharing and distribution, and should take the lead in pressing for amendments in each state. In addition, other states should follow Alabama's lead - its seed-control law explicitly allows farmer-to-farmer direct sales of up to \$3,000 worth of seeds annually without a permit.

Hats off to the librarians and activists who are working to untangle this unfortunate mess. Please support them by signing the Save Seed Sharing petition at www.SaveSeedSharing.org. To follow all the news coverage on this issue, visit the SELC's campaign partner, Shareable, at www.Shareable.net. If you're working on seed laws in your state, share developments with these groups, and with us by emailing Letters@MotherEarthNews.com. Post updates to the Mother Earth News state Facebook pages, too; go to www.MotherEarthNews.com/Facebook.

-MOTHER

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MOTHER EARTH NEWS is published by Ogden Publications Inc., 1503 SW 42nd St., Topeka, KS 66609, 785-274-4300. For subscription inquiries call 800-234-3368. Outside the U.S. and Canada, call 785-274-4300; fax 785-274-4305. Subscribers: If the Post Office alerts us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years Printed in the U.S.A.









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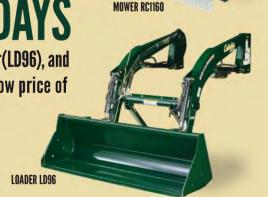
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"Thank you for putting us on the right track to building our dream home."



Readers Sandy Callahan and Mike Thomas honed their earthbag-building skills by constructing this well house. Next, they'll use their know-how to build an earthbag home.

Best Present Ever

I received a pressure canner for Christmas, and it has turned out to be the best present ever! I must admit, I was a little nervous when first using it (everyone seems to have a story about grandma's pressure canner exploding!), but I found a lot of helpful how-to information in MOTHER EARTH NEWS. Before I knew it, I was canning chicken broth. There is no sweeter sound than the "pop" of the lids sealing.

Since then, I have canned vegetables, apple pie filling, chicken pot pie filling, stew and many types of soups, and, as I write this, a batch of chili is almost ready to go into jars.

Workweek meal preparation is much easier now, and we've cut our food costs thanks to our ability to purchase bulk and discounted items and then can them. We also use our freezer space more efficiently, and, best of all, we're eating more homemade food.

> Lori Rombough Kingston, Ontario

On the Water Front

The article "Innovative Solutions to Our Water Crisis" (Green Gazette. February/March 2015) was wonderful. The quotation at the beginning-"If you think the oil wars are bad. wait until the water wars begin"-seems right on.

Several years ago, I read an article in Discover magazine that tied consumption in general to water consumption. The concept of one's "water footprint" is something I always share with the elementary, middle and high school teachers who attend the workshops I facilitate for Project WET, a national organization dedicated to water education. Spreading the word about the hidden costs of water is so important.

> Bonnie Ervin Murfreesboro, Tennessee

Trying Out Earthbag Building

We'd like to share with you a building project inspired by the article "Low-Cost Multipurpose Mini-Building Made with Earthbags" in your August/September 2009 issue.

This photo (above) is of our well house, a utility building for our well and pumps. It's 13 feet high and 16 feet in diameter. It's

Pleased with Garden Planner

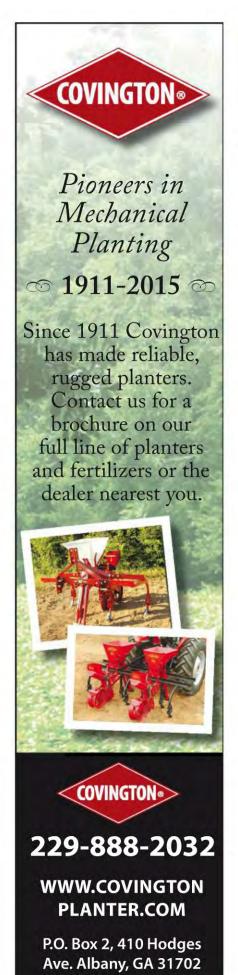
Our family loves your digital Vegetable Garden Planner (www.MotherEarthNews.com/Garden-Planner), and we've used it to plan all of our gardens here on our half-acre for the past few years. We appreciate how easy the Planner is to use, as well as how fun it makes the whole process of designing gardens. My husband and I are able to "share" visions of how our gardens should be laid out, and the Planner gives us the ability to easily work on them together. It has also taught us a lot about correct crop spacing, and it makes companion planting simple.

My husband, our two children and I started our homesteading journey about three years ago, and last summer I was able to quit my job and turn our homestead into a full-time endeavor. This has allowed me to earn money from the things we're already doing around here, such as selling fresh produce and eggs, and writing a blog about our homesteading activities.

> Sariann Irvin Bremerton, Washington



Onions, carrots and trellis-climbing snap peas thrive in this bed mapped out using MOTHER'S Garden Planner.



serving as a prototype of the home we'll eventually build.

We plan to start constructing our earthbag home this summer. It will be four times bigger than the well house, and it will have a large glass front with big wooden shutters to keep out the cold on winter nights.

Thank you for putting us on the right track to building our dream home.

Sandy Callahan Conway, New Hampshire

We'd love to see more photos of earthbag projects. Share yours with us on our new Flickr page at http:// goo.gl/pGzt47.—Мотнек

Two Views on Factory Farms in Rural America

I'm commenting on the article "Another High Cost of Factory-Farmed Meat: The Death of Small Towns" (December 2014/January 2015), which discusses how Tyson Foods destroys the small towns in which its factories are located.

I take great pride, along with about 1,500 others in this area, in working at Tyson's Green Forest, Ark., complex, and I'm highly dismayed that the article talks about a town called Waldron, yet the photo at the beginning of the article is of Green Forest's downtown, across from our city square. The photo shows only a small part of downtown Green Forest and is not representative of the town.

Tyson provides jobs and job security to many people in this area, and not just at the plant. The author failed to mention all the small businesses in Green Forest

(CONTINUED ON PAGE 92)

Lovin' My All-in-One Outdoor Oven

I found the article "Build an All-in-One Outdoor Oven, Stove, Grill and Smoker" (April/May 2010) on your website, and I really liked the setup because it's multipurpose—a grill, smoker, oven, griddle, and maybe things I haven't even thought of yet!

I'm a retired nurse, and my husband and I live in the Ouachita Mountains in western Arkansas. My primary objective for this oven was to have a means to cook in the event that we have no electricity, which happens frequently during winter.

Although a bit time-consuming and labor-intensive, this was a fun project. The instructions were easy to follow, and the unit is simple enough for one person to build. Because I'm an older woman, my husband did help me pour the concrete slab on which I built the oven, and he gave me a hand hauling all the supplies to our house. He also did most of the work on the overhead cover, but aside from that, he left the rest of the construction to me. I started last October and finished at the end of December, as many of the building steps required a drying period.

The cost was a bit more than I'd anticipated, but mostly because I made the whole oven bigger than the one in the original plans. I didn't look for any used materials to help defray the cost, and I didn't have many extra materials lying around either. The entire project cost about \$700. (I had a metalworks company make the oven door, which cost about \$60.)

I've made cornbread, pizza, pork roasts, beans and desserts with my cooking unit. It takes a little experience to know how long to cook foods in the oven, and I'm learning as I go. Pizza cooks in about five minutes! Last fall, my husband and I pruned our apple and cherry trees, and I've been cooking with the trimmings for fantastic wood-smoked flavor.

Pat Hill Wickes, Arkansas





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What's Causing Today's Mass Species Extinction?

The SIXTH

EXTINCTION

We're in the midst of perhaps the most egregious and far-reaching crime committed in the history of humankind: the mass extinction of millions of species because of the expansion and reckless consumption of just one species—us.

Like many a good mystery, Elizabeth Kolbert's book The Sixth Extinction: An Unnatural History depicts this crime through the unblinking eyes of an impartial observer. Characters and readers may have emotional reactions to the plot, but not our objective narrator. She is matter-of-fact.

Kolbert establishes the facts of her case at the outset: We are losing species at a rate thousands of times greater than at any previous point in human history. Those species are dying off for a variety of reasons, but nearly all the causes-spreading diseases, shifting ocean chemistry, habitat destruction—stem from human expansion and our rapid industrialization of the planet throughout the past 300 years.

The deaths are accelerating, along with humanity's impact on habitats worldwide. So, we have a crime. We know the perpetrator. But we don't yet have a confession.

Kolbert traces a thread of stubborn human denial. In the 18th century, most people couldn't fathom that any creature

that had once lived on Earth could have conclusively disappeared. Extinction was a difficult concept to grasp, partly because the idea implied that God's creation may not have been as perfect as humans had originally believed. Worse yet, some species seemed to have been annihilated because of human hunting, meaning human beings may have permanently altered God's creation. As researchers unearthed fossils and other evidence of longextinct species, however, public opinion gradually came to accept the idea that species don't necessarily last forever, and that humans can play a major role in their extinction.

In the 19th century, we had a hard time swallowing the revolutionary concept of evolution. Darwin asked us to believe that not only were the original creatures that populated the planet largely gone, but also that change is ever-present, and that creatures alive today—including human beings—continue to evolve under the influence of natural selection.



The Sumatran tiger is one of many species endangered because of human activities.

The recent theory that humans are to blame for the Sixth Extinction may be the most difficult of all for us to accept. The five previous major extinctions stemmed from a variety of origins, from volcanic explosions to the impact of huge asteroids. Today, however, the scientists who accompanied Kolbert to islands, mountaintops and rain forests around the world are

recording a relatively slow global catastrophe, and the causes and effects can be hard to track. We know we're altering our climate, and that acids from fossil fuels are changing ocean chemistry and wiping out thousands of species, but identifying and tracking chemical changes in mediums as big as the oceans takes painstaking research.

Some aspects of this extinction are easy to see. Many of the world's largest and most visible species—bears, tigers, rhinoceroses—are simply being squeezed out of their habitats by encroaching human development. We have cut down forests, plowed up grasslands, and built cities across environments where big mammals used to live.

Two mysteries remain unsolved at the end of Kolbert's tale: Will humans acknowledge the evidence and our responsibility to reverse the progress of the Sixth Extinction? And, if we don't, will the habitats' deterioration eventually halt the mass extinction by eliminating its root cause—us?



The Benefits of Native Prairie Strips

A new and potentially game-changing farming technique for conventional crop production is turning heads—and both farmers and environmentalists are taking a good, long look. Seven years' worth of field research at Iowa State University has developed into what's known as STRIPS, or Science-Based Trials of

Rowcrops Integrated with Prairie Strips (www.PrairieStrips.org), in which highly diverse patches of native perennial plants are

Research has shown that if just 10 percent of a field is converted to prairie strips, nitrogen loss will be reduced by 80 percent, phosphorus loss will be cut by 90 percent, and sediment loss will drop by 95 percent. Overall, 5,353 pounds of soil per acre will be kept in the field instead of washed downstream. The reasons the strips can return so many benefits are manifold, but, in part, deep-rooted native perennials add organic



Planting just 10 percent of a grainfield with native perennials will yield huge gains.

matter to soils, prevent surface runoff, and result in better water retention and filtration. These outcomes deflect the need for heavy applications of fertilizer. In other words, a small strip can make big waves in amber grain.

Integrating the prairie strips into cropland can counter the "profit vs. long-term health" conun-

drum by creating what's known as a "disproportionate benefit." By targeting the parts of a field that are both low-yielding and high in conservation value, growers can gain environmental and production benefits worth more than the collective cost of installation. Using this method costs \$25 to \$36 per acre of rowcrop, annually—and Conservation Reserve Program contracts can lower that price by up to 85 percent.

To implement STRIPS, you can contact farmer liaison Tim Youngquist at TimYoung@IAState.edu, or at 712-269-0592.

— Laura Dell-Haro

Wind and Solar Costs Can Compete

Right now, a new solar photovoltaic (PV) system gets installed in the United States every four minutes, totaling about 130,000 systems in a year. That rate is expected to jump to a new installment every 80 seconds in the next year or two. Solar power growth since 2010 has been explosive: The amount of electricity sourced from the sun has increased more than 400 percent in those five years. Wind power has experienced a

strategically woven through crop fields.

big growth spurt, too: Nationwide, wind capacity grew by 90 percent in 2012.

Overall, U.S. renewables are entering a new era of cost-competitiveness. Since January 2012, installations of renewables have accounted for about 50 percent of new domestic electricity-generating capacity, while natural gas has accounted for 38 percent and coal has clocked in at 13 percent. Jobs in the U.S. energy

More commercial wind and solar installations represent a growing trend fueled by lower costs.

industry have matched renewables' rapid growth. Solar jobs now outnumber coal mining jobs, and wind power jobs aren't far behind, especially in manufacturing. The United States is home to more than 500 plants that manufacture wind turbine parts and equipment.

What's driving the surge in solar and wind? In short, prices. The price of a PV panel has dropped 63 percent since 2010, bringing utility-scale system costs down to \$1.85 per watt. Residential PV systems cost about one-third less than they did only three years ago. Federal and state tax incentives have helped bolster home solar for years, but now more than half of new home solar systems are installed without financial help from state governments. Wind power has also seen a steep drop in costs. In the past three years, turbine costs have plummeted 40 percent, and nine states installed enough turbines to supply at least 12 percent of their electricity from wind.

-Kale Roberts

'Certified Naturally Grown' Label

Known as the grass-roots alternative to Certified Organic agriculture, Certified Naturally Grown (www.NaturallyGrown.org) is a national certification organization that assures that food labeled as such was produced without synthetic chemicals or genetically modified organisms (GMOs).

When the laws regulating the U.S. organic industry took full effect in 2002-12 years after the establishment of the National Organic Program (NOP) in 1990-some independent-minded organic farmers in New York's Hudson Valley found themselves in a quandary. Because of the prohibitive costs and hefty paperwork requirements, they didn't want to acquire Certified Organic status

from the U.S. Department of Agriculture (USDA), but realized they then wouldn't be able to call their products "organic." By law, the NOP decrees that only farmers certified by its program may use the Certified Organic label to signify they've met the required standards. So, the New York farmers opted to create Certified Naturally Grown (CNG), an alternative label that would still convey the value of the practices applied on their farms to net them an important advantage in the marketplace.

"Certified Naturally Grown is like the USDA's National Organic Program in that our certified producers must follow similar standards, farm without the use of synthetic chemical inputs or GMOs, and farm to support biological diversity and ecological balance," says Alice Varon, CNG executive director. CNG certification, however, isn't as expensive or time-consuming as securing certification from the USDA's program. In some states, USDA organic certification can cost thousands of dollars. CNG charges \$200 or less, and the paperwork load is much lighter, too. All certification and inspection documentation is available online for every participating farm.

- Joanna Poncavage



Look for "Certified Naturally Grown," a label tailored specifically to direct-market farmers producing food for their communities.



Geek out over seeds at Seed Savers Exchange's Campout in Iowa this July.

A Seedy Celebration

Care to camp in a beautiful setting, meet a bunch of people who are passionate about seeds and gardening, and hear some excellent speakers? Then start making plans to attend the Seed Savers Exchange (SSE) Conference and Campout, taking place at Heritage Farm from July 17 through 19 in Decorah, Iowa. This annual event brings together a range of seed enthusiasts, from beginning growers to some of the biggest names in the seedstewardship movement-and this year's gathering will coincide with SSE's 40th anniversary, so it's sure to be a memorable bash. Keynote speakers will include Deborah Madison, Joe Lamp'l and Craig LeHoullier. To learn more, go to www.SeedSavers.org. -Shelley Stonebrook

Greenwashing Alert

Since 2000, green builders have looked to LEED (Leadership in Energy & Environmental Design) for guidance on design and construction. LEED-certified buildings promote sustainability, save resources, and are better for people and the planet. Now, a competing certification system called Green Globes is criticizing LEED and trying to position itself as the alternative. But it turns out that the Green Building Initiative (GBI), which administers Green Globes, is supported by dues from the chemical, plastics and conventional timber industries. According to a report by Greenwash Action, a joint initiative of Sierra Club and Greenpeace, the GBI's "members and supporters" include groups that directly contradict the goals and practices of green building, such as the American Chemistry Council. The report, online at http://goo.gl/r2bZPw, reveals that Green Globe's standards allow toxic building materials (such as endocrinedisrupting chemicals in carpet), less stringent forestry standards, and other not-so-sustainable approaches to building.

-Amanda Sorell

Funding for Farmers

Last November, the National Sustainable Agriculture Coalition (NSAC) released its online Grassroots Guide to Federal Farm and Food Programs. This guide is a collection of information on more than 40 grants, loans and resources that you can easily browse by focus area (local food, rural development and more). In the guide's overview, fundseekers can peruse a chart that details all available programs and who's eligible. Say you're a new organic farmer-you can scroll through the programs listed under the "Beginning Farmers" and "Organic Production" sections to find your funding options. Just click on the program name for full details, including how to apply. While the NSAC won't fill out the paperwork for you, they've made one of the most mysterious parts of receiving federal money-knowing your options-a whole lot easier. You can check the guide out at www.SustainableAgriculture.net/ Publications/GrassRootsGuide.

-Jennifer Kongs



SPRIN(SENTINELS Asparagus and Chives

These two perennials arrive in the garden at the same moment, which makes them natural companions on the springtime table.

Story and photos by Barbara Damrosch

hen the first asparagus shoots come up in our Maine garden in early May, it's a big event. If I see one first, I keep quiet, the better to surprise everybody a few days later with a handful of fresh, young spears. With few vegetables ready to pick at that time, they're a rare gift after winter's long wait—so ephemeral, so effortless.

Growing Asparagus

Like any perennial crop, asparagus needs to be well established from the start, in a deeply cultivated bed well amended with compost or manure. Add lime as needed if your soil is acidic - asparagus prefers a soil pH of 6.5 to 7.5. You can grow asparagus from seed, but many gardeners find it more convenient to buy year-old dormant crowns from a local nursery or feed store. Plant them in spring in an 8-inch-deep trench, spreading out the crowns' tentacle-like

roots and covering them with 4 inches of soil. As the shoots grow, fill the trench the rest of the way. In our garden, we have two long rows 4 feet apart, with the plants set 2 feet apart in the rows. Fully grown, they form a backdrop for the garden, far enough from other crops that the fronds don't shade any nearby plants, even when the ferny tops have grown to a mature 5 feet tall.

After planting, resist the temptation to pick the first-year spears that come up. The plants need to build up their strength for three years before they are harvestable. (Well, OK, you can steal a few in year two.)

Asparagus season, for a mature planting, lasts six weeks. After that you must stop picking and let the foliage grow in order to nourish the roots. But before the six-week cutoff you can - and should—use a sharp knife to cut any spear at ground level when it reaches 6 to 8 inches. That will keep production going. As the stems grow, the little overlapping scales at the tips will start to open in an effort to make branches,

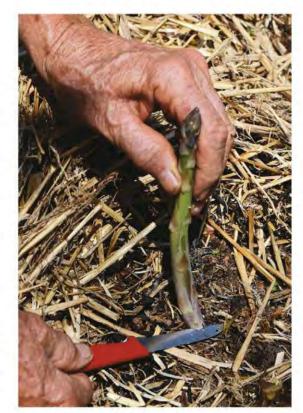




but try to pick them while the scales are tightly closed. That's when the spears taste best. The fresher, the better: If possible, pick asparagus at mealtime, on the way to the stove. But if you must hold it, store spears upright in the refrigerator with the cut ends in a glass of water. You can eat asparagus raw, but the heat of cooking brings out more of its flavor.

Maintenance of your asparagus bed is crucial. It's an easy thing to neglect when so many summer crops need tending, but weeds must not be allowed to take hold. A thick mulch of hay, straw or seaweed (which asparagus loves) will minimize annual weeds, add fertility as it decomposes, and give protection in winter, but it will not deter witchgrass, dandelions,

wild blackberries and other stubborn invaders. If any of these become established, they're hard to grub out without damaging the asparagus roots. You may need to brush aside the mulch to get the weeds out, but keep at it.



Use a sharp knife to cut 6- to 8-inch asparagus stalks at ground level to avoid injuring the asparagus crowns.

Adequate moisture is needed to ensure an abundant crop the following year, so irrigation in dry weather is important, too. It's often necessary to support the plants when they become tall. I use 4-foot grade stakes, available at lumberyards and hardware stores, strung together with jute twine. Steel T-posts also work well.

Planting and tending an asparagus bed is admittedly a more ambitious project than sowing a row of lettuce, but people who commit to it find that the investment of time pays off in years of harvests. Consider it a landscape feature as well as great food. At summer's end the foliage will turn a handsome gold before it's time to cut it back to the ground for the winter, top dress with compost or manure, and reapply a thick mulch. And, at last, there's that magical day in spring when the asparagus wakes up again.

Asparagus as Your Best Dinner Guest

Simplicity is best, and brevity is essential. The tips of spears are fragile and will fall apart if overcooked. The stems are a little sturdier, and you'll sometimes want to peel extra-thick ones, or even pare them down a bit, so they all cook uniformly. I try to pick them at—or trim them to—about 6 inches long.

Lemony Asparagus with Chive Blossoms

This simple dish depends on the quality of its main ingredient, so try to use the freshest asparagus spears. Serve it as a side dish at any meal, or as the centerpiece of a light supper along with toast and scrambled eggs. Yield: 8 to 10 servings as a side, 6 to 8 as a main course.

1 large bunch, about 2 pounds, asparagus 2 tbsp freshly squeezed lemon juice 4 tbsp extra-virgin olive oil 1/2 tsp coarse sea salt Freshly ground black pepper

After trimming, place the spears in a steamer over simmering water for about 8 minutes or until just tender. Drain well and arrange on a platter or on individual plates.

Combine the lemon juice and olive oil in a small glass or pitcher and whisk vigorously, or shake together in a small, covered jar. Pour over the asparagus. Sprinkle with salt and pepper. Pluck the individual florets from the chive flower heads and scatter them over all. Serve at room temperature.



2 chive blossoms







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My favorite cooking method is to steam asparagus over simmering water for 8 minutes (more or less, depending on size), or until just tender when pricked with the tip of a knife-not mushy and not hard. The spears will bend but not droop when you pick them up from the middle, and can be easily cut with a fork. Often I'll butter the warm spears, and serve them just like that. Or, I'll blanch them by plunging the spears immediately into a sink filled with cold water for just a second or two to stop the cooking, but not to chill them. This will help the spears retain their bright green color if they're not going to be eaten for a little while. Try grilled asparagus, too, or roast it in the oven with garlic and olive oil.

After a week or two of buttered asparagus heaven, a cook might like to branch out and make composed salads, such as the one with shrimp below. You can also serve asparagus on toast, or in rice pilafs and risottos, or in endless pasta dishes, from primavera with other early vegetables to a cheesy rigatoni. A creamy sauce, a lemony sauce, a Mornay sauce, a hollandaise - asparagus wears all of these very well. You can

tuck asparagus into an omelet, add it to a stir-fry, simmer it in a soup, or bake it in a quiche or a gratin. Asparagus will keep for a week in the fridge and can even be frozen, but I prefer the freshpicked, six-week orgy during which this vegetable truly shines.

Cultivating Chives

Many fresh herbs go well with asparagus, especially chives, which are also permanent residents of the garden, popping up early with stunning greenness. Outdoors, they are prolific (often self-sowing close to the mother

Asparagus and Shrimp Salad with Honey-Saffron Dressing

Topping asparagus and lettuce with shrimp turns a salad into a luxurious appetizer, or even a light meal in itself. I find this a good way to end the day in early summer, topped with a honey and saffron dressing that lends a bright golden color as well as rich flavor. You can sprinkle this dish with either scallions or chives. This dressing is also good on cold lobster or scallops. Yield for salads: 4. Yield for dressing: about 2/3 cup.

About 32 medium-sized asparagus spears

32 raw shrimp, deveined, with head and shells removed

3 tbsp olive oil

1 large butterhead lettuce, washed and torn into pieces

2/3 cup Honey-Saffron Dressing (instructions at right)

2 scallions, green tops only, chopped,

or chives

Coarse sea salt

Freshly ground black pepper

Honey-Saffron Dressing

2 tbsp white wine vinegar 2 tbsp honey Pinch of saffron 6 tbsp olive oil

Trim the asparagus to about 6 inches long, and steam or simmer for 8 minutes or until just tender. Blanch by plunging into cold water to stop cooking, drain and set aside.

Dry the shrimp thoroughly. Heat the olive oil in a small saucepan until fragrant and medium-hot. Using a pair of long tongs to protect yourself from spatters, quick-sauté the shrimp in batches, dropping in 6 to 8 at a time. Don't crowd the pan. Flip them with the tongs, cooking only until translucent, about 11/2 minutes per side. Drain on paper towels. Both the asparagus and the shrimp can be cooked ahead and refrigerated for a short time until ready to serve.

Distribute the lettuce among four plates. Arrange the asparagus on top, then the shrimp. Pour the dressing over all, letting it make a bright yellow pool around the edges, then scatter on the scallions or chives. Add salt and pepper to taste.

To make the Honey-Saffron Dressing: Heat the vinegar, honey and saffron together in a small saucepan over low heat, just enough to liquefy the honey. Pour into a small, lidded glass jar, add the olive oil, and then cool to room temperature. Shake to mix thoroughly before drizzling over the salad.



clump) and keep going all summer and fall. For harvest, scissors are the tool of choice, and it's easy to gather and cut a bundle of the slender leaves, discard any that have turned yellow or brown, and then snip into tidy little segments. Cutting the clumps back periodically keeps them fresher and neater, but I do let some of the chives blossom, and then cut the plant back after that.

The flowers are lovely, violet globes that provide nectar for bees and garnishes for cooks. To brighten up a dish, I pluck individual florets from the globes and scatter them over the top. Chive blossoms have a very strong onion flavor, and a whole head consumed at once would be too much of a good thing.

Chive Kitchen Jives

If you have a lot of chives, experiment with using them as a vegetable in their own right. For instance, instead of dotting a cold soup, such as vichyssoise, with minced chives, drop in a few handfuls before puréeing, to give it an assertive flavor and a bright green color.

Indoors, chives are a disappointment to grow. The plant's sensitivity to day length makes it go dormant when the days are short. Any that I've brought in have attracted whiteflies as well. The crop can be either frozen or dried, though, without a total loss of flavor and color. In both cases, snip them into sprinkling-sized lengths, and spread on parchment paper on a cookie sheet. Dry at your oven's lowest setting until crisp, or freeze for 30 minutes. Use the paper to funnel them into tightly sealed jars or freezer bags. **

Esteemed garden writer Barbara Damrosch farms and writes with her husband, Eliot Coleman, at Four Season Farm in Harborside, Maine, Find even more asparagus recipes in her latest book, The Four Season Farm Gardener's Cookbook (available on Page 80).



Baguette Sandwiches with Asparagus

Call it a vegetable hot dog, if you will. To my mind, a fresh baguette makes a tastier wrapping than a spongy bun or hero sandwich roll. Here, the baguette cradles lightly cooked asparagus, enriched with mayonnaise and melted Gruyère cheese. (You can add a smear of mustard as well if you like a little more bite.) Yield: 4 sandwiches.

16 spears medium asparagus, trimmed to 6 inches long

1 fresh baguette

1/2 cup mayonnaise

1/2 cup Dijon-style mustard, optional

1/4 pound Gruyère or Comté cheese, grated (use French cheese, if possible)

Grill or steam the asparagus for about 8 minutes, or until just tender, then set aside. Cut the baguette into 6-inch lengths and split them lengthwise to make a valley, without cutting all the way through. Scoring the insides of the valleys with your knife will allow you to pry the baguettes open more easily to fill them. Spread liberally with mayonnaise and optional mustard, if using, and nestle the asparagus spears inside, then distribute the grated cheese over the top. Place the sandwiches under the broiler for 2 to 3 minutes or until the cheese has melted. They are best eaten while still a bit warm, and may be cut crosswise into smaller portions if desired.

Read "All About Growing Asparagus" at http://goo.gl/FSGJcb for more information on raising and storing asparagus.

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Tips and Techniques for WATER-WISE GARDENING

Tap these efficient garden-watering systems to save on your water bill while still growing food despite drought and heat.

By Barbara Pleasant

his gardening season, with climate change causing higher temperatures and desperate droughts in multiple regions, many of us will experience weeks or even months in which sparse

rainfall won't keep pace with the sun's hot rays. To keep your crops' thirst quenched, try some options outlined in this roundup of water-wise gardening strategies, from familiar irrigation methods—such as soaker and drip hoses—to a lesser-known system called "partial root-zone drying."

The best watering methods will depend at least partly on planting arrangement and crop type. Planting leafy greens, onions and other shallow-rooted plants in blocks rather than rows will simplify watering, especially if you water by hand. With crops that occupy more time and space in the



garden, such as beans, peppers, sweet corn and tomatoes, better options include using soaker hoses, drip irrigation or carefully managed ditches. Even with regular rainfall, crops that require a relatively large amount of water to thrive, such as beans and sweet corn, will almost always need supplemental irrigation.

Make Foes of Weeds and Friends with Mulch

A water-wise garden is no place for weeds. According to research from Michigan State University, a combo of good weed control and adequate mulch can conserve up to 1 inch of water per week during toasty summer months. Left uncontrolled, however, some weeds, such as crab grass and lamb's-quarters, will slurp up more than 80 gallons of water to produce just 1 pound of plant tissue.

Fundamental organic gardening practices that improve soil and limit weeds will set the stage for efficient garden-watering systems. If you add compost or rotted

manure to the soil each time you plant, as well as use biodegradable mulches that break down into organic matter, your soil will retain moisture better. In general, the more grass clippings, leaves, coffee grounds and other organic materials you add to your soil, the less likely your crops will be to suffer from moisture stress. Another reason to be mad for mulch: Even before it breaks down into organic matter, a thick layer of mulch applied around plants will help by cooling and shading the soil, thus keeping your garden from drying out quickly after a watering or rain shower.

Soaker Hoses and Drip Systems

I have long been an advocate of the 25-foot soaker hose, which weeps water evenly along its length, as if it were sweating. Soaker hoses work especially well for closely spaced crops and intensively planted beds. You can make your own soaker hoses by collecting old or leaky garden hoses from your friends and drilling small

holes into them every few inches. Just cap or clamp off the male end of the hose.

Drip irrigation systems distribute water at regular intervals through a network of hoses or tapes with slits, pores, emitters or drippers. They work well for rows of crops spaced at varying intervals (you can set the emitters at wider spacing if you're watering a crop planted farther apart), and perform best on relatively level ground, because pressure changes caused by sloping ground would result in uneven watering. If you have a large garden, look for systems that use inexpensive drip tape (brands include Aqua-Traxx, Chapin and T-Tape). The tiny holes in some emitters and drippers can become clogged with soil particles rather easily, so at least one filter needs to be screwed into the water line between the faucet (or reservoir) and the distribution lines of most drip irrigation systems.

Typical soaker hoses require at least the level of pressure from a faucet, but some drip emitter systems can use gravity alone to gradually distribute water from high cisterns or raised rain barrels to thirsty plants. For example, growers at New Mexico State University had great success raising 50-gallon water barrels head-high on a frame or platform and attaching several drip lines that fed out to a large garden plot.

To achieve deep watering from soaker hoses or drip systems, let the water run for several hours, turn off the water for an hour or so to allow the moisture to penetrate, and then water some more. Especially in clay soil, water from soaker hoses or drip irrigation can be slow to move to the subsoil, so these systems are best used often so the soil never dries out. I recommend using a timer to keep track of when to turn your soaker hoses on and off. Another memory aid: Put a rubber band around your wrist. If you're getting ready for bed and you find the rubber band still there, it means you forgot to turn off the water.

Buried Reservoirs

While drip systems work well for crops planted in rows, crops grown in wide beds may do better when planted around a buried reservoir designed to deliver water to the plants' root zones, about 4 to 8 inches below the soil's surface for many crops. Plus, gravity-fed systems and buried reservoirs



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Ramp up watering efficiency by using drip tape in your garden beds. Drip irrigation works especially well for evenly spaced crops planted in long rows.

would free you of any worries about whether you remembered to turn the water off. One ancient technique is to bury porous terra cotta jugs, called ollas, leaving just the mouths of the jugs aboveground. Fill them up, and they'll then slowly seep water to plants' roots. Handmade ollas aren't widely available, but you can order them online at specialty stores (try www.DrippingSpringsOllas.com or Shop. GrowingAwarenessUrbanFarm.com/Ollas).

After noticing that hard-shelled gourds often survive intact for more than a year in my compost pile, I plan to try using them as biodegradable ollas this summer. I'll drill some tiny holes, cut off their necks, fish out the seeds, and - voilà! - gourd ollas!

Try the humble plastic milk jug or kitty litter container for more immediate olla alternatives. Fill jugs two-thirds full of water and freeze them. When frozen solid, take them outside and make lots of little holes in them using a drill or nail, covering all sides with holes up to the jugs' shoulders. (Freezing first will keep the sides stable for easy drilling.) Bury your jugs in early spring, before you plant crops. Place such reservoirs where a tipi of beans will go, or in the center of where you'll plant a trio of peppers, filling them as needed.

If you have some black plastic nursery pots, you can turn these into water reservoirs, too. Line the bottoms with a double layer of newspaper, fill the pots with small rocks or stones, and then sink

them into the soil up to their rims and fill with water as needed.

Simple Irrigation Ditches

In extreme summer climates, where plants are screaming for water at the end of hot days with drying winds, old-fashioned irrigation ditches are quite practical when closely monitored. Your garden should be relatively level and laid out in rows for ditches to work efficiently. When crops are still small and you're hoeing to control weeds, cut shallow

The more organic matter in your soil, the less likely your crops will be to suffer from moisture stress.

trenches along at least one side of each row. Then, when plants need to wet their whistles, simply drop the hose in one end of the ditch, continue with other chores for a bit, and then remove the hose after the ditch has filled.

Mother's Editor-in-Chief, Cheryl Long, likes to use irrigation ditches for most of her crops. "I choose soaker hoses for my perennials, such as strawberries and asparagus, but for annuals, I find it's easier to use a hoe to shape irrigation ditches right after planting," she says. This method won't require any extra equipment, and it will direct water to plants' root zones and keep you from watering paths and other unintended areas.

What About Sprinklers?

Popular and affordable, sprinklers will save time when you need to keep newly planted seed beds constantly moist, and periodic use of sprinklers can help dissolve salts that accumulate at the soil's surface in some regions. Overhead irrigation via sprinklers may also be a good option if you

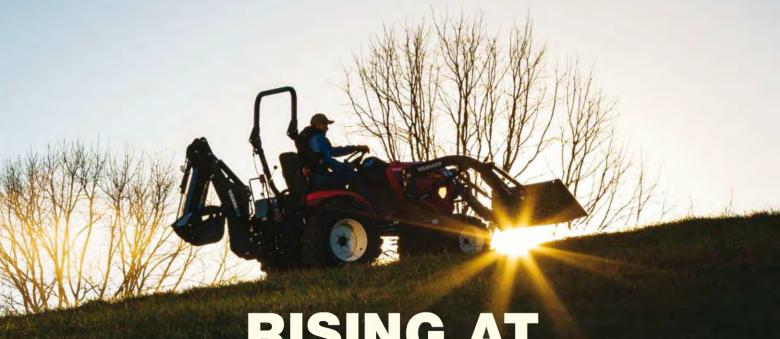
have a large planting of crops with wide root zones, such as winter squash, the roots of which can reach up to 25 feet in diameter in just 11 weeks.

The main downside to sprinklers is that they can be wasteful—they water walkways and other unplanted areas, and a significant amount of water is lost to evaporation and wind. Plus, especially in humid conditions, leaves dampened by sprinklers may stay moist and

become a hotbed for diseases. Watering sweet corn, staked tomatoes and other tall plants with a sprinkler can also prove challenging unless you elevate the sprinkler head to a height taller than the crops. In most situations, other garden-watering methods will be more efficient.

Rainwater Storage

One way to store rainwater is to direct runoff from your roof out into your garden. Most soils can hold a great deal of water in the root zone, and roof runoff



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Apply thick mulch to increase the water-holding capacity of your soil (left). Overhead irrigation benefits crops with wide root zones, such as squash (right).

can help you keep your soil's moisture levels high. We explain this approach indepth in "A Better Rainwater-Harvesting System" (read it at http://goo.gl/wwhDri). Many gardeners capture roof runoff in rain barrels for use in the garden. Routing stored water from barrel to garden will be easy if the rain barrel sits more than a foot higher than your garden, because gravity or siphon action will move the water effortlessly to your crops.

But what if your house is lower than your garden? The highest beds in my terraced hillside garden are more than 10 feet above the nearest rain barrel. A garden at a higher elevation than its water source is not a rare situation. At an off-grid organic farm near me, farmers use a solar pump to carry water from a spring to the highest part of the farm, where it's stored in a tank or an aboveground cistern. From there, the water goes into gravity-fed drip irrigation lines—an elegantly simple system that can be replicated in a home garden by employing the kind of pump intended to move water in decorative fountains. On a sunny day, this type of inexpensive solar pump could easily be put to more practical use moving water uphill from your barrel to a waiting reservoir.

For an aboveground water-holding cistern, you can fill additional barrels, build a pond with a plastic liner, or find recycled, 275-gallon food-grade IBCs (Intermediate Bulk Containers), available online. A metal stock tank from a farm store would also fit the bill. Such a tank can perform mul-

tiple functions and will last for decades. In summer, the tank can be placed at the highest part of the garden as a water reservoir and produce-washing station. In spring and fall, use it for soaking shiitake mushroom logs, washing dogs, or other messy, wet tasks.

Sometimes, carrying water by hand is the only way to get it to where you need it, but water is heavy. Most watering cans hold 2 to 21/2 gallons, which will weigh about 20 pounds when full (water weighs about 8 pounds per gallon). When I must carry water, I prefer hefting two partially filled watering cans rather than one that's brimming. I spill less this way, and this method is easier on my back. Better yet is

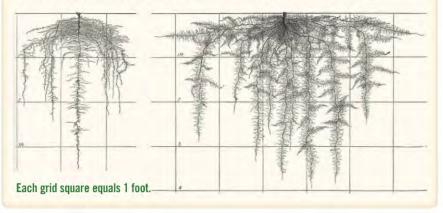
to use a carrying pole, also called a "yoke," that fits across your shoulders, making it possible to evenly balance two buckets using the strength of more body parts.

Sunken Beds and Planting Pits

In chronically dry climates with poor soils, such as the Southwestern United States and Western Africa, vegetable yields skyrocket when crops are grown in sunken beds that capture and retain scant supplies of rainwater. The Zuni Pueblo tribe of New Mexico has long sculpted its gardens into a series of 2- to 3-foot-wide squares, with the excavated soil piled into ridges around each square to create a waffle-like

Encourage Deep-Reaching Roots

Vegetable crops' roots can reach surprising depths. Here, a 10-week-old spinach plant (left) and a nearly mature pepper plant (right) have already hit 4 feet. Whichever watering systems you use, as your crops begin to mature, water deeply and less frequently so roots grow strong and reach down farther, rather than watering often but shallowly.







Try new methods: Water into trenches dug alongside crops (left), or water into buried reservoirs, such as old milk jugs, with holes poked into them (right).

design. The ridges channel rain into the beds and provide a bit of shade and wind protection for the crops.

Popular in the small African country of Burkina Faso, the Zai pit method involves digging a series of holes—roughly 8 inches wide—and then refilling them partway with compost and manure. The excavated soil then gets piled into berms that shade and channel water to double rows of these permanent planting holes, which are refreshed with manure and compost each year. The Zai pit method at least tripled the productivity of millet in dry desert climates, and it has also worked miracles in the degraded soils of Ethiopia, increasing potato production five-fold, tripling the productivity of beans, and boosting overall water efficiency by 500 percent on average, according to a 2011 report published by Cambridge University Press.

Throw Some Shade

In dire situations where hot sun and wind threaten to desiccate gardens, you can turn down the heat with shade covers or windbreaks placed alongside plants, or by planting shelter crops. For example, old window screens or pieces of lightweight cloth attached to stakes on the south side of your tomatoes can serve this purpose. In much of Texas, where drying winds necessitate water-wise gardening every season, green windbreaks of fall-planted grains, such as wheat, rye, sorghum or oats, shield winter onions and spring vegetables, and switchgrass, tall sunflowers or corn serve as shelter crops in summer. Ideally, the shelter crop will be well-established along the garden's perimeter before regular garden crops go in.

Snow fencing makes a wonderful windbreak that's easy to install by attaching it to metal stakes. Growers in hot, dry climates use this technique to shade the root zones of tomatoes and peppers while leaving the plants' canopies open to the sun. Windbreaks can be quite small, too-place a wood shingle upright in the soil next to transplanted seedlings to block prevailing winds and harsh summer sun.

Partial Root-Zone Drying

In studies of the novel irrigation method known as "partial root-zone drying," completed in 2009 at the University of Copenhagen, scientists grew tomatoes in partitioned pots so that only half the roots could be watered at a time. When half the roots were allowed to dry out, the plants launched defensive maneuvers. Leaf stomata remained partially closed to reduce moisture loss, and roots foraged more efficiently for nitrogen. Meanwhile, new growth and fruit development continued, because the plants' watered sides received ample water and nutrients. Today, farmers are successfully using the partial root-zone drying irrigation method on corn, grapes, peppers, potatoes and other crops.

Here's how to put it to work in your garden: Grow crop plants normally for the first six weeks, or until they are wellestablished. After that, employ soaker

hoses, drip lines or irrigation trenches to provide water to one side of the plants at a time. When the plants need watering again, irrigate the opposite side. Partial root-zone drying will reduce yields slightly, but won't affect fruit quality, and that small loss will be offset monetarily by saved water. When combined with soaker hoses or drip irrigation, the partial rootzone drying method will significantly improve watering efficiency.

DROUGHT TRACKERS

When a drought has you in its grip, you desperately want to know when it will end. Here are some tools to help you find out when it will be right as rain again.

U.S. Drought Portal: One of the best drought-monitoring tools available. Searchable by ZIP code, and includes early drought warnings. Go to www.Drought.gov.

U.S. Drought Monitor: Hosted by the University of Nebraska in collaboration with several federal agencies. Updated weekly with a written summary and reports from nine geographical regions. Go to www.DroughtMonitor.UNL.edu.

Climate Prediction Center: Hosted by the National Weather Service, and provides daily updates on drought-related weather data and predictions. Go to www.CPC.NCEP.NOAA.gov.

Some plants can take the heat better than others can. Choosing drought-tolerant crops and varieties is one savvy strategy of water-wise gardeners. Head to http://goo.gl/Wsbn6A to browse a chart of our top recommendations.



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The Multiple Benefits of GRASS-FED MEAT

Grazing ruminants play an important role in maintaining our health and protecting the environment. Give those animals grain in feedlots, however, and these health benefits become health risks.

By Richard Manning

his story hinges on two numbers: 5.0 and 6.8.

At 5.0—the figure that dominates today's industrial food chain—both you and the environment suffer. For humans, it means more obesity, more diabetes, more heart disease, more weakened immune systems, more feeble brains and dementia, maybe even more cancer. For the environment, it means more carbon in the atmosphere, more floods, more erosion, more dying streams and lakes, more cruelty. Push that number to 6.8, however, and we can reduce all of those problems.

Ruminating on pH

These two numbers measure the health of an ecosystem that was the linchpin of human development through the hundreds of thousands of years of our evolution to our modern form. That ecosystem is still essential, because the fundamental facts of humanity have not changed: We are big-brained, upright mammals that thrive in grasslands.

Compared with other organs, the human brain is an energy hog, and because our brains are big, we need more calories and nutrients pound for pound than other animals do. Our upright posture places extraordinary constraints on our structure, especially our center, and dictates a small, muscular abdomen. No room for guts to process a lot of food at one time.

Grass is useless to us—directly. We can't eat it. Its energy is

Grass is useless to us—directly. We can't eat it. Its energy is locked up in cellulose, and we don't have the intestinal fortitude (or magnitude) to break those calories loose. So here's the deal evolution cut for us: We outsource grass digestion to the deer, gazelle, musk ox, elephant, caribou, elk, aurochs, goat, sheep and, now especially, cow.

All of those animals have in common a cavernous gut that is

centered on a fermentation vat called the "rumen"—hence their name, "ruminants." Like all fermentation vats, the rumen is an ecosystem. It works by harboring bacteria that have the unique ability to break down cellulose to more usable forms of carbohydrates. The bacteria depend on a friendly environment in the rumen, which, especially in cows, happens to be best measured by acidity: a near-neutral pH of 6.8.

Grass is
useless to us
directly, so
we outsource
its digestion
to grazing
animals.

Subverting Evolution

In evolutionary terms, feeding ruminants grain instead of grass—the now near-universal habit of the industrial food chain—is a radical and arrogant experiment, tinkering with the basic function of a whole suborder of animals. The dense carbohydrate load of grain completely reworks the ecosystem of the rumen, creating an acidic pH of 5.0, which causes the condition called "acidosis." A cow with this condition has an acid concentration in its rumen that's 200 times greater than in the rumen of a healthy cow. Grain makes cows sick, and in this matter, organically grown grain makes no difference. The damage reverberates in human health.

The normal, grass-happy bacteria digest cellulose to yield a combination of carbohydrates and essential fatty acids, which are those fats our bodies must have but cannot manufacture. A healthy, grass-fed digestive system delivers a mix of fats weighted to healthful fatty acids, including omega-3s. The sick, acidified rumen of a grain-fed animal supports different bacteria that yield a nutrient profile that will produce more omega-6 fatty acids. Research suggests that a diet high in omega-6s may create inflammation in humans, and a wide range of human health problems—from obesity to heart disease to dementia. (Our increased use of high omega-6 vegetable oils in recent decades has also shifted the balance of omega-6s to omega-3s. More about this in an upcoming issue.)

A healthy rumen is proof positive that a cow has been eating grass, shrubs and forbs—a wide variety of deep-rooted perennial plants. Ruminants range because they must eat an enormous volume of food. This diverse diet concentrates an array of minerals and micronutrients in their milk and meat. This phenomenon extends beyond ruminants to hogs and chickens. The latter two are omnivores rather than ruminants, but they still bioaccumulate minerals and micronutrients if they feed on perennial pasture. Perennial pasture plants are deep-rooted, and they deliver a whole string of key nutrients and trace minerals—such as copper, magnesium and iodine—that shallow-rooted annual grains cannot.

Much research bears this out. For instance, a 2010 review article that examined all available publications on the benefits of grass-fed meat confirmed the assertion that levels of essential omega-3 fatty acids are higher in grass-fed meat, eggs and dairy, compared with industrial products (see chart on Page 34). The review also confirmed increased levels of other key beneficial fats, and of nutrients, such as beta carotene,

Eating nutrient-dense meat from animals that grazed on perennial pastures helped humans evolve into bigbrained, upright creatures. vitamin E and cancer-fighting antioxidants, in grass-fed meat. Advocates for grass-fed systems (and the authors of some other studies) say these conclusions are actually overly conservative.

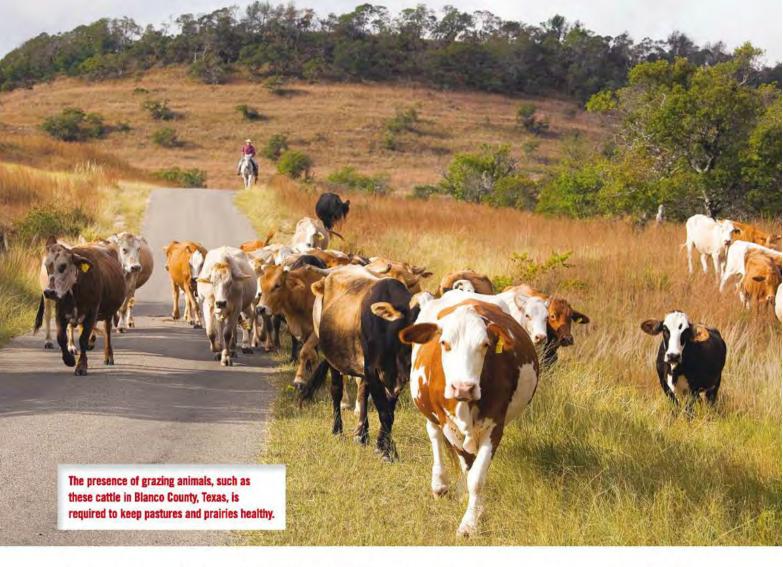
The Problems with Feedlots

Eggs, milk and meat from grain-fed animals come mostly from confinement systems and feedlots, and many issues arise from this fact. To begin with, an acidic rumen makes cows sick, so industrial dairy cattle have a scandalously short life span of just three to five years. Because of acidosis, all feedlot animals have compromised immune systems that require a steady flow of antibiotics to prop up. The threat this poses to human health through antibiotic resistance is serious and well-documented.

Feedlots are manifestly cruel, yet their less-obvious spinoff effects are also egregious. For instance, much attention has justifiably been focused on the environmental threat of the mountains of manure generated in feedlots and confinement operations. But a recent study by the U. S. Geological Survey of an area of southern Idaho plagued with an explosion of feedlot dairies showed that the nitrogen pollution from the fields that grew the grain and silage for the feedlots was about twice as bad as the feedlot manure itself.

Looking at the larger footprint of feedlots yields an even more appalling picture. For example, the British National Trust, which manages more than 600,000 acres in the United Kingdom, conducted an exhaustive examination of the research on the full range





of environmental costs of feedlots and benefits of pasture in 2012. The report, which you can read online at http://goo.gl/n77KMs, cites both the Trust's own studies as well as the available literature from the United States and Brazil—and ends in favor of pasture. Reducing global warming looms especially large in this study. A 2006 report from the Union of Concerned Scientists, which you can read at http://goo.gl/KKX48A, offers a similar conclusion, and includes qualifications that affirm the environmental costs of concentrated animal feeding operations.

Straight Lines vs. the Circle of Life

An industrial farm field is linear: Fertilizer, seed and water go in, and grain for cattle and soybeans for Tofurky come out. It's easy enough to see that a farm field with a single crop, its nutrient cycling solely dependent on the nozzle that sprays anhydrous ammonia fertilizer, is not a healthy ecosystem.

Yet we can't create circular, sustainable ecosystems simply by replacing corn and soybeans with the two or three hundred species of plants normally resident in a native prairie. The system needs grazing animals and their rumens to digest and recycle cellulose. Without them, the grasses grow old and rank; nutrients remain locked in them, because animals disdain such mature grass.

An ecosystem is cyclical, with cycles of life and death capturing, storing and reinvesting energy. Death and decay recycle nutrients, so they are integral to an ecosystem's productive

capacity. Sustainable grassland ecosystems must include plants, microbes and grazing animals. Big animals with rumens drive the entire process, meaning these systems cannot be healthy without them.

To Eschew Meat—or Not?

A consumer considering whether to eat animal products seems to have two ways to proceed.

One course is to disengage by eating no milk, meat or eggs, a decision seemingly supported by a long body of shortsighted research that traces human disease and environmental destruction to meat and milk. Virtually all of this research is based on the food products of animals kept in feedlots and fed on grain. The fatty acid profile of these animals' products, so high in omega-6s, by itself is enough to explain the deleterious effects on human health cited in those studies.

Avoiding meat and dairy deprives a body of nutrients, however. We're focusing here on the differences between grass-fed and grain-fed, but products of both systems have a lot in common. They both contain high concentrations of essential amino acids—proteins—difficult to obtain from plant sources, as well as vitamins A, B6, B12, D and E, and minerals, such as iron, zinc and selenium. Good grazing practices ramp up beta carotene in animal products, meaning the fat, egg yolks, milk and butter show a deeper yellow or orange color (think of beta-carotene-rich



Choose grass-fed or wild animal products whenever you possibly can. The meat of grass-fed ruminants, such as sheep, goats and cattle; wild cold-water fish, such as salmon; and grazers, such as wild or farmraised bison, gives you more nutrients than that of feedlot animals.

carrots). This color in dairy products and animal fats is a sign of good grazing.

This greater nutrient density in grass-fed products begins an argument for the other course—not disengaging, but rather following the path that supports healthy ecosystems. The magic of working ecosystems is that the whole is greater than the sum of the parts, which is why "reductionist" research, which looks at only a single detail, doesn't describe the whole. Nonetheless, the pieces describing the benefits of grass-fed meat do make a compelling case:

Nutrition. By every indication, the benefits of grass-fed meat are numerous—especially in its fatty acid profile. This is not a small thing, and piecemeal evidence suggests additional nutritional benefits contribute to grass-fed products' superiority.

Environment. Some research says that grass-based production systems increase carbon sequestration, which means grass-fed meat probably has a smaller carbon footprint than industrial animal production. Grass-based production certainly creates less erosion, uses less energy, and reduces the use of chemical fertilizers and pesticides.

Social justice. A close look at a set of counties in southern Idaho now dominated by feedlot dairies found that undocumented immigrants held 80 to 90 percent of the jobs in the industry, by the industry's own admission. These are miserable jobs, and childhood poverty and low wages plague the area, while income and farm subsidies are concentrated among a few mega-farms. Meanwhile, in a 2006 University of Wisconsin survey of all varieties of farmers in the dairy state, in which nearly 25 percent of dairy production comes from pastured animals, farmers whose cows grazed perennial pastures reported the greatest life satisfaction.





Economic viability. All sectors of grass-fed production are growing, driven by profit, not subsidy. The public is beginning to understand and act upon the arguments I'm summarizing here.

Pastured Products Done Right

In 2010, the journal Agricultural Systems published a paper titled "Comparative Life Cycle Environmental Impacts of Three Beef Production Strategies in the Upper Midwestern United States." The paper concluded that feedlot beef production has less environmental impact than grass-fed does. It was the sort of thoughtful and reasoned accounting that might give us all pause in the rush to buy products from pastured animals. The paper was anchored in valid assumptions, and one of those was to base the calculations on existing grazing practices in Iowa—where farmers typically seed old corn ground to annual grass, fertilize it, and then turn the cattle in. There are large energy costs in seeding, renewing and fertilizing these "pastures" each year.

This is a devil in the details and it's exactly why much of the nutritional and environmental evidence on grass-fed meat is highly variable and even contradictory. Grazing on an annual monocrop (usually wheat) is not the same as grazing on perennial pasture. Meat from animals on even poorly managed grazing can sport the U.S. Department of Agriculture's grass-fed label, however, because that standard requires only that pasture was the animal's sole source of nutrition. The animals may have the ideal rumen pH of 6.8, but the nutrition from those monocrop pastures doesn't equal its perennial prairie counterpart of deeprooted plants pulling nutrients from deep in the soil.

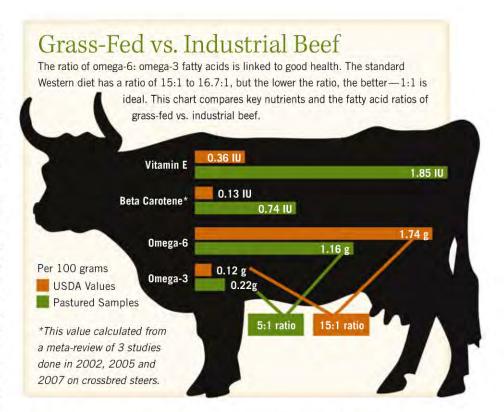
The USDA standard is not good enough. The grass-fed movement commits to a system usually labeled "managed intensive rotational grazing," which mimics the effects of the wild ruminants, such as bison, that dominated the North American prairie for thousands of years. (Joel Salatin discusses rotational grazing in more detail on Page 75.)

Many of the benefits of grass-fed meat in general are greatly amped up under this perennial pasture regime. For instance, rotational grazing causes grass and other plants to slough off and regrow roots. The dead root matter is largely carbon, so this is the engine of carbon sequestration in the soil. Grazing, together with photosynthesis, stores carbon in the soil, and the soil thus becomes more fertile. Meanwhile, remaining roots drive deeper, giving the plants access to subsoil nutrients. Biodiversity increases, as a range of bugs, crawlers and microbes digest the dead matter in the soil.

Legumes fix nitrogen as they do in a natural prairie—no seeding, fertilizer or renewal required. The goal is, in other words, permanence and sustainability through ecosystem restoration. If rotational grazing on perennial pasture is done right, the energy costs included in that Iowa cropland example cited earlier would never accrue, and suddenly the balance sheet looks much improved.

The 2011 report "Raising the Steaks" by the Union of Concerned Scientists gets at the crucial issue in all of this: The key is not just grazing, but how the grazing is done. The report, available at http://goo.gl/YDfcPQ, concludes that managed grazing offers gains, especially in terms of environmental impact and methane production. The amount of methane released decreases

Grass-fed meat is tender and tasty if pasture is managed correctly.



when cows eat high-quality forage from a managed perennial pasture that works like a restored ecosystem, compared with cows grazed on annual grass. The Union of Concerned Scientists' report confirms that the better the forage, the less methane.

Genetics also play a role in grass-based systems' success. Modern cattle have been bred to function in feedlots, but old-line breeds, some now resurrected, fatten months faster and yield more usable meat when fed grass than breeds with feedlot genetics.

All of this is relevant to calculations of economic and environmental efficiency, but such calculations are almost nowhere considered in published research. Crossing that line from feedlot to even badly managed pasture heads us in the right direction.

> Beyond that, we can drive the system further toward smart, environmentally sound grazing by insisting on a more demanding standard than the USDA's current grass-fed label requires, by buying locally, by knowing producers, by education.

> Advocates of grass-fed systems say there's another indicator of good pasture rotation. Badly managed pasture makes beef tough and less tasty, milk and cheeses less flavorful. Well-managed, deep-rooted pasture creates products with fine flavor and healthful benefits. Simply, we can taste and see quality and nutrition, which is evolution's way of making us take the trouble to find them.

Richard Manning hunts his wild meat near his home in Montana. He is the author, with John J. Ratey, M.D., of Go Wild, which we highly recommend for more on this topic. It's available on Page 80.

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25 Fresh Ways to PUT EXTRA FOOD TO GOOD USE

Don't scrap your scraps! Reduce food waste by transforming your leftover morsels into meals.

Edited by Amanda Sorell

he pleasures of home-prepared food made from fresh ingredients are many, but using up all those odds and ends that don't make it into the meal can frequently pose a chal-

lenge. Thankfully, conscientious cooks can control what happens to some of the nourishment that would otherwise go to waste. We asked editors, friends and fans how they anticipate and avoid food waste in their homes. Hundreds of responses poured in, showing that food "scraps" have a solid standing in the kitchen, if only we help them live up to their potential.

Thrifty Tips

Plan ahead. Leftovers from Monday night's roast chicken can become tacos on Tuesday and a robust salad on Wednesday. Planning your meals in advance is the first step toward buying only what you need, and using every last bit. This will keep you from filling your cart too full when you're at the store—and from emptying your wallet too fast. Use a mini-chalkboard, whiteboard or pinned-up printed calendar in your kitchen to list the week's meals and keep yourself on track. Make your grocery lists accordingly, and when you do plan to cook something substantial, such as a whole chicken or roast, make sure your meals for the following nights incorporate the food that will be left over.

Freeze your foods. Jessica Kellner, editor-in-chief of Mother Earth Living, urges eaters to employ their freezers. "If I have browning bananas but no time to do anything with them, I'll pop them into a freezer bag and save them for the next time I want to make banana-oat cookies, banana bread or a smoothie," Kellner says. "Same with most produce—if you have tomatoes that are about to go bad, stick them in the freezer, and then use them in a sauce, stew or casserole later."

Preserve herbs. If you buy bundles of fresh herbs from the store or farmers market—or have a lot to harvest from your garden - Mother Earth News Managing Editor Jennifer Kongs has a recommendation for saving them: "If you can't use the whole bunch within a week or two, chop the herbs, press them into an ice cube tray, and then cover them with water or olive oil. Freeze them, and then pull out a cube or two anytime you need to add an herbal lift to a dish. Drying is another good option: For rosemary, sage, thyme and oregano, bundle and tie the ends together, and hang them in a dry place. When the herbs have fully dried, store them in a spice jar for up to a year."

Compost. Reader Dorinda Troutman works her food scraps into a productive cycle that incorporates the entire homestead. "I have chickens, so anything left over in the kitchen or the bottom of the fridge ultimately goes to them, and they turn it into manure, which becomes compost and goes back on the garden to create more meals and leftovers," she says. You can compost, too, no matter where you live or how much space you have. Read "How to Make Compost" at http://goo.gl/qpkH4s to get the dirt on a number of composting setups, including worm bins, tumblers and a plain old hole in the ground.





Dry bundles of herbs for long-term culinary use (top). Give yesterday's mashed potatoes new life by frying them up into herbed potato pancakes (bottom).

Double up. Mother Earth News Senior Associate Editor Robin Mather, author of The Feast Nearby (available on Page 80), minds her energy bills while also diminishing food waste: "If I'm going to cook something in the oven for a long time, such as a stew, I'll typically also bake something alongside it, such as muffins or cookies," she says. "Even if the secondary dish goes straight into the freezer, I've saved the energy needed to bake it." You can tap this tactic by roasting a tray of vegetables while baking dinner or dessert, for example.

Mather also takes water conservation into consideration. "I use leftover water from my kettle to rinse off my dishes before putting them into the dishwasher," she says. This water and any greywater you collect can also be used to water plants or even flush your toilet.

Remnant Revival

Those commonly discarded bits in your kitchen can add zeal to new meals. The following tips, which range from familiar to unique, will help you pull as much as possible out of your perishables.

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Reuse cooking oil several times by straining it after each use. Place a funnel in the mouth of a canning jar, and then line the funnel with a paper coffee filter. Slowly pour cooled oil into the funnel, and allow it to filter through and drip into the jar. Put a lid on the jar and store it for your next use. You can save the oil-soaked filter to start a fire in your fireplace or fire pit. — Mary Ann Wall Yancey

When your hens lay a surplus of eggs, whisk them up and freeze them raw in con-

tainers with one-eighth teaspoon salt or 1½ teaspoons sugar for every four beaten yolks to keep them from becoming sticky. Label each container with the number of eggs inside. The eggs will come in handy in winter, when fresh eggs are scarcer. To thaw, place the containers in the refrigerator overnight, and then use the eggs as you would fresh eggs. - Roberta Bailey

Freeze milk that's on the edge of turning sour in recipe-sized portions - usu-



Make friends with your freezer to keep your leftovers fresh. Label each container with its contents and the date to fend off forgetfulness.

ally a cup or half-cup—and use it for cooking. It's even better to go ahead and sour it before freezing by adding 1 tablespoon of vinegar or lemon juice per cup, and then to treat it as buttermilk. Use it in pancakes, muffins, quick breads and other baked goods that call for buttermilk.

Save bones and vegetable scraps in the freezer to make stock. You can also freeze bits of cooked roasts, chicken, pork, etc. After you have enough to fill your slow

cooker, start the stock by covering the food scraps with water, and then cook on low for 12 to 24 hours.

Freeze the small odds and sods of hard cheeses, such as Parmesan, cheddar, Swiss and Gouda. When you have a bagful, thaw them and whiz them together in a food processor or heavy-duty blender along with half the cheeses' weight in butter and a tablespoon or two of brandy. You'll then have potted cheese spread. - Robin Mather

I never throw out the tops of celery stalks. Instead, I dehydrate them and grind them up to use as a seasoning. — Jessica Kaml

I chop up the outer leaves and stalks of cauliflower and use them in soups and stir-fries. - Ros Tosi

My favorite way to use leftover mashed potatoes is to make potato pancakes for breakfast. Here's how:

Beef 'Stoup'

My wife, Gwen, makes a soup/stew-we call it "stoup" - that's great for using vegetables that are close to turning. These ingredients are just a suggestion; you can use any vegetables you may have. Yield: enough servings for an army.

3 pounds ground beef or stew meat

1/4 cup white flour

3 cups whole tomatoes

8 carrots

1 bunch celery

Potatoes, squash, zucchini, corn or any other veggies on hand, about 1 cup, chopped

Beef stock or water

1 cup barley

Spices or dried herbs, such as basil, oregano, Greek seasoning, black pepper, thyme or garlic powder

Brown the beef in a large stockpot over medium-high heat. Drain the excess fat, sprinkle flour over the beef, and cook, stirring, until



flour has browned. Chop your vegetables, including the whole tomatoes, and add them to the pot. Fill the pot with stock or water until the veggies and meat are covered. Bring to a boil, reduce heat and simmer. Add barley and spices. Simmer on low until the barley is cooked and the vegetables are soft, about 45 to 50 minutes.

-Caleb D. Regan, managing editor at Grit magazine



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While about a tablespoon of oil or butter is heating up in a frying pan, mix rosemary, salt and pepper with the chilled mashed potatoes, and then shape them into patties. Dredge the potato patties in flour for a nice crust, and then fry them up into potato pancakes. I enjoy them with eggs, Brussels sprouts and coffee.

I put cut-up chunks of stale bread in the freezer until I have about 1 pound. When I'm ready to use the pieces of bread, I fetch them out of the freezer, let them defrost a bit, and then bake them with raw eggs, vegetables, cheese and a bit of cream to create a satisfying strata. — Hannah Kincaid

I turn dry bread into breadcrumbs, or I cut it into cubes and season it with garlic, butter and herbs for homemade croutons. — Janette Hartman

I save the last pieces of fruit that no one wants to eat, such as the final few grapes, strawberries or blueberries. I keep them in the freezer, and then a couple of times a year, I haul them out, put them all together in my food processor, add a little sugar and a little pectin, and voilá!—it all becomes some of the best jam you'll ever taste. If you don't believe me, just ask any of the recipients of my special mixed-berry jam! - Cindy

Really ripe fruit that we aren't able to eat goes into the blender. Blend 2 cups of fruit, 1 tablespoon of sugar if needed, and 1 teaspoon of lemon or lime juice, and then put the mixture into molds and freeze for fruit popsicles. My personal favorite is 1 cup of nectarines or peaches mixed with 1 cup of strawberries. Sometimes, if I have extra pie crust, I'll make mini-pies with the fruit, too. - Stephanie Figg

After squeezing limes or lemons, I freeze them to later stuff into a chicken before I roast it. This imparts a citrus flavor and also helps keep the meat moist. - Sarah Matteson

Loaded Enchiladas

This one-pan classic is perfect for incorporating all kinds of vegetable scraps and other "extras" you may have lying around. Make sure you have good tortillas and enchilada sauce, but other than that, you can put practically anything inside enchiladas and end up with a delicious meal. Here are some ingredients I've added and loved, most of which are optional.

Finely chopped vegetables, such as broccoli, cauliflower, squash, peppers or potatoes Chopped greens, such as spinach or kale Finely diced garlic, onions or shallots Olive oil

Cooked beans

Diced, shredded or ground meat, such as seasoned hamburger, chicken, roast or steak Cooked grains, such as brown rice or millet Salt, to taste

Herbs, such as cilantro or chives

Spices, such as cumin, chili powder or paprika Enchilada sauce

Enough tortillas to hold ingredients

Cheese, such as cheddar, pepper jack, goat cheese or queso fresco

In a large pan, sauté any raw ingredients in olive oil until tender. Chop cooked items—such as steamed broccoli, baked potatoes, roasted squash or leftover meat—into small pieces and add them to the pan, along with any cooked grains. After everything is combined, season the mixture with salt, spices and herbs to taste.

Next, pour some enchilada sauce into a baking pan large enough to hold the number of enchiladas you want to make. Coat tortillas with sauce on both sides, and then place a bit of your filling on each tortilla. Sprinkle on some grated cheese, and then roll



up the tortillas and arrange them in the pan. Pour the rest of the enchilada sauce over the top, cover the pan, and then bake for 25 minutes at 350 degrees Fahrenheit. Then, pull out and uncover the dish, and sprinkle the top of the enchiladas with a bit more cheese. Bake them for 5 minutes more, then serve.

If you have extra filling, store it in the fridge, and then eat it with a bit of cheese melted over the top sometime in the coming days.

You can do practically this exact same thing with lasagna. Just layer your tomato sauce, cooked lasagna noodles, a cheese/herb blend, and your anything-goes filling mixture in a pan and bake it for 30 minutes or so at 350 degrees, until bubbly. Or, consider adding your leftovers to a pot of noodles along with tomato sauce for a hearty spaghetti.

- Shelley Stonebrook, senior editor at Mother Earth News





Be frugal with your fruit! Zest your lemons before use (left) and shape aging fruit into popsicles (right).

I always zest my lemons, limes and oranges before peeling, slicing or juicing them, and then I freeze the zest. The next time I need zest for any recipe, I just pull it out of the freezer. — Trina Reynolds

I use the pulp left in my juicer to top salads or other dishes. I also use it in homemade breads and veggie burgers. - Lori Bonner

Don't throw away the pulp from juicing fresh vegetables. Instead, add it to soups and stews to thicken and stretch them. — Anne-marie De Waal Coetzee

When I make a pie, I use the pastry bits left over from cutting around the edge of the pie to make an appetizer. I scatter a bit of grated Parmesan cheese over them, and bake them at 400 degrees Fahrenheit for 10 minutes. - Katherine Britton

I grind up leftover roasted meat and mix it with mayonnaise and relish to make a filling for sandwiches. - Jean Ray Weddle

Add 2 cups of leftover cooked vegetables to a food processor with an egg, a quarter-cup of flour and a tablespoon of cream. Using a small ice cream scoop, drop the mixture onto a cookie sheet, and then place the sheet in the fridge to chill for 30 minutes. Then, place leftover meat from a pot roast in a saucepan with your favorite barbecue sauce, and simmer it on medium-low for 30 minutes. Finally, remove the balls and deep-fry them. Put the meat on bread for a barbecue sandwich, and enjoy it along with the fried vegetable balls. — Xris Hess

We steam a big batch of rice and keep it in the refrigerator to use later in all kinds of quick dishes throughout the week-in burritos, with red beans, and as fried rice.

Our favorite version of fried rice uses up all the standard neglected vegetables in the crisper-especially mushrooms, bell peppers and the butts of onions - and sometimes we throw in leftover sausage from the night before. For extra protein, we'll add an egg. We drop all the ingredients into a large skillet, fry them with sesame oil and toasted sesame seeds, and serve with soy sauce on the side. — Rebecca Martin **

Breakfast 'Muffins'

To make these breakfast bites, you'll need a muffin tin, but you won't need paper liners. Think of this as a formula, not a recipe.

Any vegetables you have, such as onions, celery, green peppers, spinach or potatoes Butter or oil

Spices and herbs, such as basil, oregano, rosemary, cumin or garlic powder Grated cheese, such as provolone, mozzarella, cheddar, Swiss, Parmesan or Asiago Leftover meat, such as ham, bacon, ground beef or diced chicken

2 eggs per muffin

1 tbsp milk or cream per muffin Salt and pepper, to taste

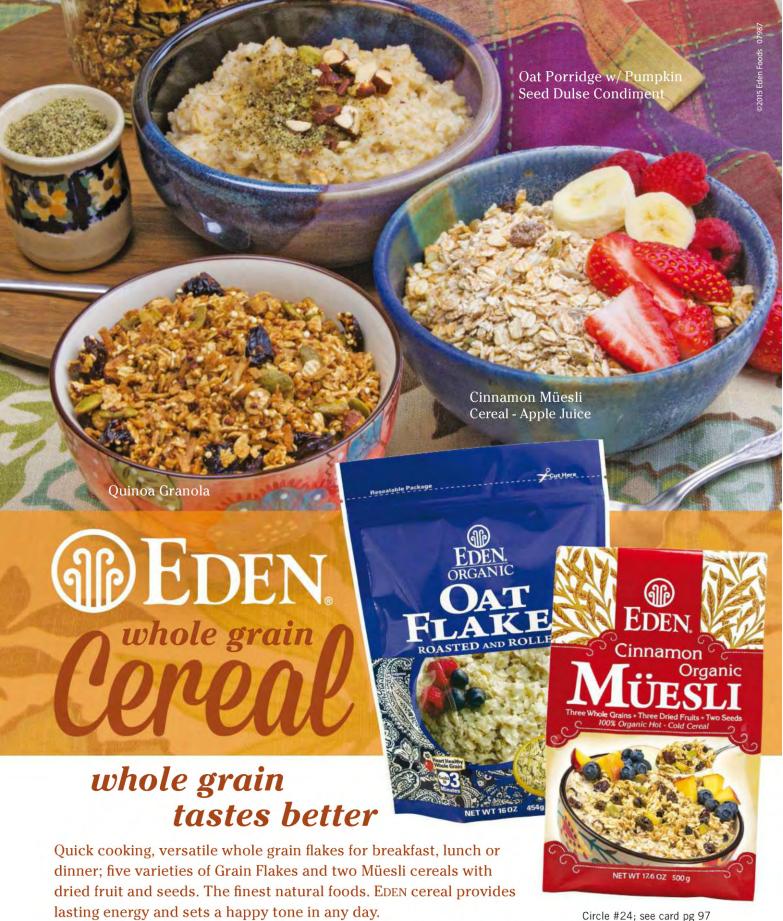
Preheat your oven to 350 degrees Fahrenheit. Cook the vegetables until tender in a skillet with some butter or oil, seasoning them with spices and herbs, to taste.

Butter each cup of the muffin tin, and put about 2 tablespoons of grated cheese into the bottom of each one. Add about 1/4 cup of sautéed vegetables. If you're using leftover meat, add it now.



Beat the eggs with the milk or cream, if using, and pour the mixture into each cup, to about a half-inch from the top. Season with salt and pepper. Sprinkle more grated cheese on top. Slide the tin into the oven and bake until the egg is cooked and the cheese is nicely browned, 10 to 15 minutes. These breakfast muffins will keep for a week in the fridge.

-Robin Mather, senior associate editor at Mother Earth News



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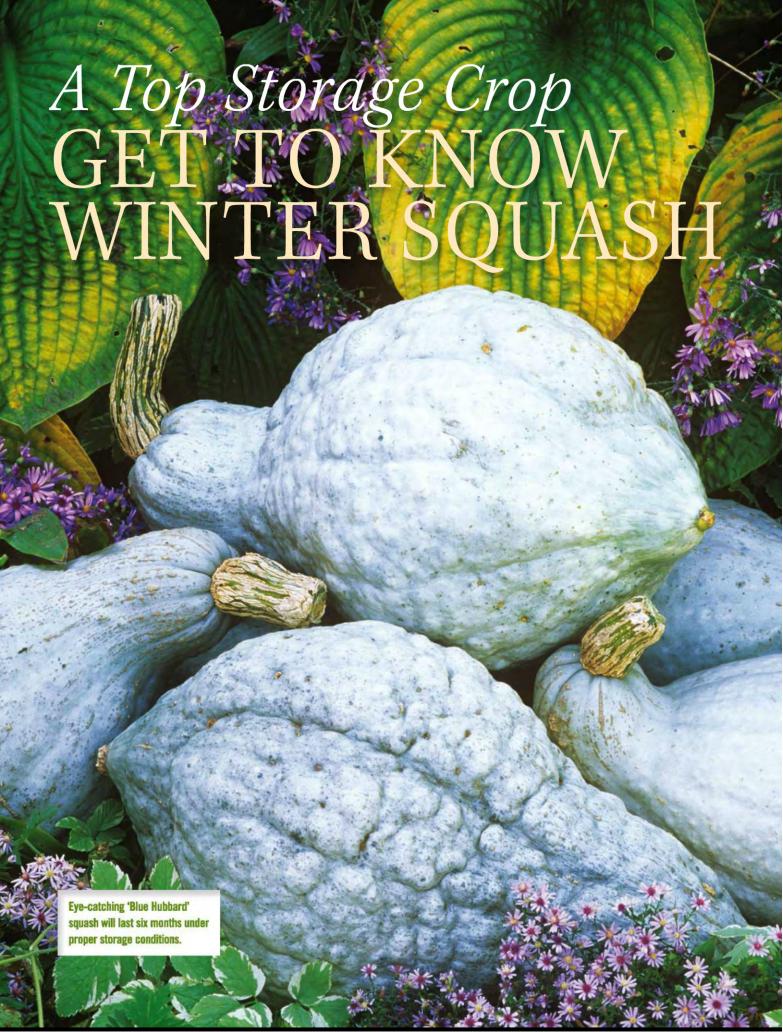












Plant now to stock your winter pantry with creamy buttercups, delectable delicatas and nutty acorns.

By Barbara Pleasant

f you're gardening to raise as much food for your household as possible, winter squash should be near the top of your planting list. Heaps of winter squash varieties are nutritious and easy to store, but which will grow best in your region? And how should you deal with pest challenges?

To give you the scoop on squash, we surveyed a few hundred readers and Facebook fans, and we touched base with organic farmers around the country who are big into this crop. Respondents offered up their six favorite winter squash types, listed here in order of popularity. You'll also find cooking advice and preferred varieties. Warning: You may want to try them all!

You can grow all types of winter squash in hills or in rows. Most varieties produce on large, sprawling vines. The easiest cultivation method is to create planting hills along the edges of your garden, and then to enrich the hills with plenty of compost or manure. Encourage the vines to run outside the garden to save space and prevent overcrowding. If possible, grow at least three plants of the same squash species to achieve the best pollination. In cool climates, you can mulch the plants with black plastic to warm the soil. Start plants indoors to gain growing time for late-maturing varieties. After harvest, cure winter squash by brushing off the dirt and allowing the fruits to rest for two weeks in a dry place where temperatures range from 70 to 80 degrees Fahrenheit. Store cured fruits in a cool, dry place, such as your basement, a closet or beneath a bed. Check stored fruit every two weeks, and immediately cook any squash showing signs of spoilage.

Butternut Squash

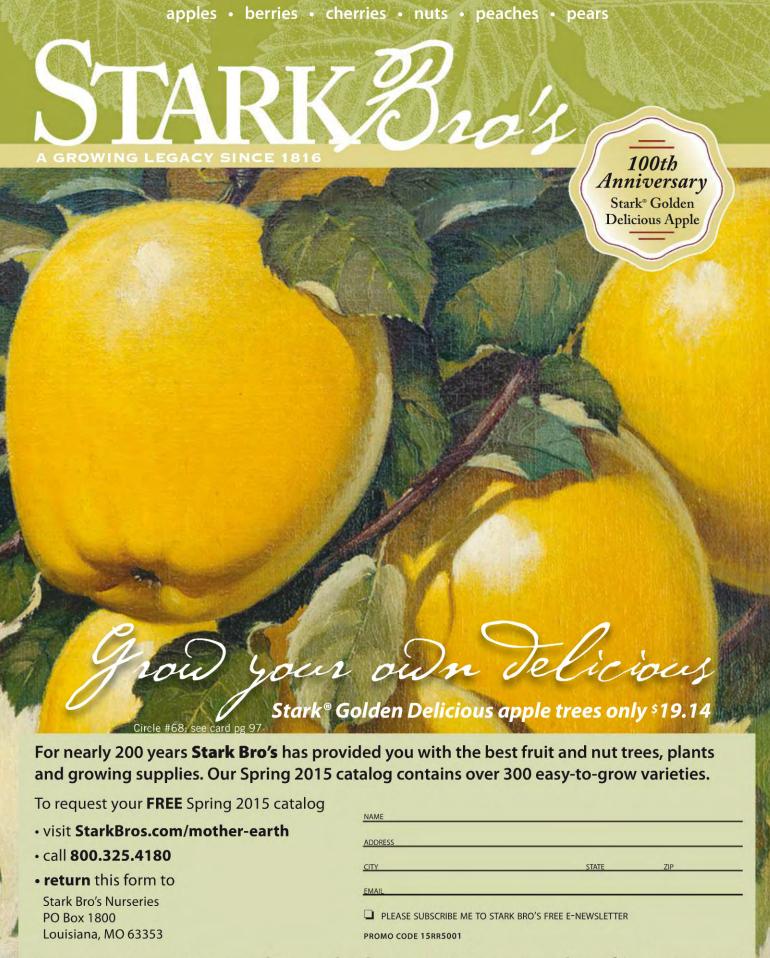
Bulbous, smooth-skinned butternuts (Cucurbita moschata) get high marks among organic gardeners because the sturdy vines are naturally resistant to squash vine borers, and because squash bugs usually prefer other types of winter squash. Butternuts need up to 110 days of warm weather to produce a good crop, so they may not ripen fully in cool climates, especially if powdery mildew weakens the plants. Be sure to allow plenty of space for the vines, because butternuts don't tolerate crowding. Properly cured fruits will store for six months or more.

Top varieties. Open-pollinated 'Waltham' produces 4- to 5-pound fruits on rambling vines that are susceptible to powdery mildew. Fruit size varies a bit, but many gardeners report that they can get large and medium fruits from a single plant. If you need more compact plants, try 'Butterbush,' an open-pollinated variety that bears small fruits weighing less than 2 pounds. For powdery mildew resistance, grow hybrid 'JWS 6823 PMR' for its vigorous vines that produce 3- to 4-pound fruits.

In the kitchen. Butternuts are easier to prepare than other types of winter squash because you can remove the rinds with a vegetable peeler. The deep-orange flesh is ideal for purées and soups. Roast butternut squash to remove moisture and caramelize its sugars, and to prepare a big fruit for use in multiple dishes.



Tight on space? Train small-fruited varieties of winter squash up a trellis.



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From left: 'Waltham' butternut, 'Honey Boat' delicata and 'Thelma Sanders' acorn squash. Readers give butternuts high marks for resistance to borers.

2 Delicata Squash

Gardeners love delicatas for their looks and the sweet flavor of their 1- to 2-pound striped, oblong fruits. Not preferred by squash bugs but susceptible to vine borers and powdery mildew, delicata squash (C. pepo) is ready to harvest in about 90 days, and the cured fruits will store in a cool place for three to four months. Delicata's growth is more compact compared with that of other winter squashes.

Top varieties. Open-pollinated 'Delicata' produces fruits up to 9 inches long on robust, fast-growing plants. The soft skin of the striped fruits is edible after it's cooked. Open-pollinated 'Honey Boat' squash has nutty, yellow-orange flesh that's high in calcium and vitamins A and C.

In the kitchen. Delicata's flesh is at its best when the fruits are halved, baked and buttered, although some cooks also like to grill or pan-sear unpeeled slices. When filled with a savory stuffing, a baked delicata half can become a one-dish meal.

3 Acorn Squash

Compact acorn squash plants yield heavy crops of pleated fruits weighing 1 to 2 pounds. Most varieties have green rinds, but some ripen to orange or tan. Acorns (C. pepo) are susceptible to squash vine borers, but are of only passing interest to

squash bugs and cucumber beetles. Plants can be seriously weakened by powdery mildew. The fruits mature in 90 days and will store for two to three months.

Top varieties. Open-pollinated 'Sweet REBA' has good resistance to powdery mildew. This variety produces abundant yields of dark green fruits with golden flesh. Heirloom 'Thelma Sanders' has tan skin and creamy flesh with flavor notes of roasted chestnuts. This open-pollinated variety stores better than other acorns.

In the kitchen. Baked acorn squash is as delicious stuffed with savory meats and grains as it is with spiced apples and raisins. Keep it simple by dressing with

Patrolling for Pests: Successful Management Strategies

There's no quick fix when it comes to squelching squash pest problems, but you can keep the bothersome bugs under control.

Plant non-preferred squash types to discourage your region's worst pests. Gardeners in the eastern United States favor butternuts over

other squash types because borers usually leave the plants alone.

Start plants indoors to give them a strong beginning, and then grow them under protective row cover until the flowers open for pollinators to visit.

Delay planting your main crop until early summer, after many squash bugs and cucumber beetles have found other host plants.

Plant trap crops by early direct-seeding a few pest-magnet squash, such as 'Baby Blue' Hubbard or yellow straightneck summer squash. When squash bugs or borers find the trap crops, cover those plants with a bag, pull them up and discard them.

Check plants often for squash bugs' shiny brown egg clusters, and rub them off with a finger or a





Learn to identify squash vine borers (top) and squash bugs (bottom) to better manage infestations in your plot.

wet cloth. Gather nymphs with a hand-held vacuum, or crush them with your fingers. Trap squash bugs by placing small boards under plants during periods of cool weather. Early in the morning, overturn the boards and brush bugs into a bucket of soapy water.

> Repel vine borers from susceptible squash varieties by wrapping aluminum foil shields around the base of the plants' stems after you've removed the row covers.

Encourage natural predators, such as ground beetles and damsel bugs, by growing a bed of mulched perennial flowers and herbs in a central part of your garden. Add sweet alyssum, dill and other easy annuals to attract parasitic tachinid flies and other winged squash bug predators.

Grow squash in areas ranged by poultry. Chickens, guineas, geese and ducks will nab adult pests that are in search of host plants. Expert homesteader Harvey Ussery reports that using portable electric fence netting to pen a few guineas in a squash patch is highly effective.







From left: 'Golden Hubbard,' 'Vegetable' spaghetti and 'Burgess' buttercup squash. Buttercups often are regarded as the best winter squash for pies.

butter and honey or brown sugar. You can save cooking time by roasting thick, unpeeled slices instead of halves.

4 Hubbard Squash

Prized for their dry, orange flesh and stability in storage, long-vined Hubbard squash (C. maxima) grow best in the cool, moist climates of New England and the Upper Midwest. Depending on variety, the fruits can weigh 5 to 15 pounds, with bumpy rinds that may be bluegray, green or red. Vines usually set only a few fruits, and the plants struggle in hot climates. Hubbards are attractive to all squash pests, so they are often grown as trap crops. (See "Patrolling for Pests" on Page 47 for tips on using trap crops.) Most varieties need 100 days to mature, and the fruits will store for six months.

Top varieties. The heirloom 'Golden Hubbard' variety produces 8- to 12-pound fruits with dry, fine-grained flesh. The rinds turn orange as they cure. 'Blue Ballet' yields smaller 4- to 6-pound fruits with gray-green rinds that contain sweet, fiberless flesh.

In the kitchen. The most difficult part of working with Hubbard squash is cutting it open, which is best done by hacking a stout knife into the rind and then tapping on the knife's dull side with a mallet until the fruit splits open. The pared pieces can be boiled, steamed or roasted and used in pies and soups.

Spaghetti Squash

Prolific and fast-growing, spaghetti squash plants produce heavy crops before powdery mildew can weaken their vines. Squash vine borers and squash bugs can infest spaghetti plants. A wide range of climates are suited to growing spaghetti squash (C. pepo), which mature in about 90 days and will store for about three months.

Top varieties. Open-pollinated 'Spaghetti' supplies family-sized, 3- to 5-pound fruits. The vines are 15 feet or longer and often develop supplemental roots as they grow, giving them an edge against squash vine borers and drought. The oblong 'Stripetti' hybrid carries some delicata genes that give the

fruits green stripes and a sweeter flavor than other spaghetti varieties. Hybrid 'Small Wonder' produces heavy crops of 2- to 3-pound fruits that store well.

In the kitchen. The tender strings of cooked spaghetti squash resemble pasta. Bake or steam halves of the squash until just done, and then tease out the mildly flavored "noodles" with a fork. Purists add only butter, salt and pepper to this delicate dish. In casseroles, layer spaghetti squash with pasta sauce and Parmesan cheese.

6 Buttercup Squash

Grown as a sweet potato substitute in northern climates, buttercup squash (C. maxima) has long vines that run up to 15 feet and produce 2- to 5-pound fruits. The dense, dark-orange flesh becomes flaky when baked, like starchy potatoes. Buttercups are often regarded as the best winter squash for pies. The plants are moderately susceptible to pests and are especially well-adapted to the Pacific Northwest and Upper Midwest. Fruits can take up to 100 days to mature and will store for six months.

Top varieties. The 2- to 4-pound fruits of hybrid 'Sweet Mama' mature slightly earlier than those of other buttercups - before powdery mildew can affect the vines. Open-pollinated 'Burgess' buttercup produces blocky 3- to 5-pound fruits with smooth, sweet flesh.

In the kitchen. Cut peeled buttercups into wedges, and then toss the wedges with olive oil and herbs before roasting in an open pan. Prepare buttercups for pies by baking halves or steaming large chunks. 🏝

The 'Compleat' Book on Squash

Choosing which winter squash varieties to grow is challenging when we have hundreds of options to consider. Happily, gardener Amy Goldman has done the legwork for us while researching her encyclopedic book The Compleat Squash. Goldman evaluated 150 heirloom varieties by raising them and then testing their qualities in her kitchen. Here are some of her all-time favorite types and varieties, along with a few of the reasons she adores them.

Buttercup: Sets the standard of excellence. Dry and sweet-meated. Not a whisper of fiber.

Hubbard: Proves that bigger is better. Thick, rich flesh. Excellent table quality.

'Sibley': Best banana squash—and that's saying a lot. Dry, with a delicate flavor.

'Thelma Sanders': The sweetest acorn squash. Chestnutty.

'Triamble': Meaty, sugary, brilliant orange flesh. A shelf life of two years isn't unheard of.

'Vegetable' spaghetti: The closest thing to pasta since durum wheat. Sweet, golden fiber.

ND SEEDS! Use our Seed and Plant Finder at www.MotherEarthNews.com/Custom-Seed-Search to locate seeds for these top winter squash varieties.



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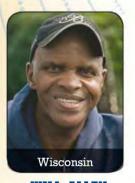
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NIFTY POTTING BENCH PLANS

Build a convenient in-garden work surface with storage for small tools and supplies.

By Spike Carlsen

o you wash your garden produce on the lawn with a hose? Or transplant seedlings on top of your picnic table, or on your knees in the garden? If so, this DIY potting bench will make your gardening chores easier and faster. The handy bench will let you work at a comfortable height, and will provide a central place for stashing your hand tools and supplies. The tubs will offer places to store soil, compost, waste and other materials. You can even add a sink to one side.

Before building your potting bench, purchase the storage tubs or baskets you'll be using for the cantilevered wings, and tweak the dimensions of the bench parts accordingly. The materials and cutting lists are divided into sections for the bench (Page 51) and cabinet (Page 52), so you can build only one component if that's all you need. Choose cedar or another rotresistant lumber. Cedar board dimensions usually aren't as uniform as those of pine, so adjust your measurements accordingly.

Plot the Potting Bench

1 Cut the 2-by-4 legs (A, B) and leg blocks (C, D) to length as indicated in the cutting list on Page 51. Use a compass to draw 3½-inch-radius semicircles on the top end of each of the rear legs (see A in drawing on Page 52), cut the ends to shape with a jigsaw, and sand the edges smooth. Secure the legs (A, B) and leg blocks (C,



These versatile plans show you how to build the entire project as shown, or you can choose to construct only the potting bench (lower section) or cabinet (upper section).

D) to one another with construction adhesive and 10d galvanized nails. Make the space between the leg blocks wide enough to tightly sandwich the platform and slats that will fit between. A gap that's too big will result in a wobbly workbench, while a gap that's too small will mean you'll have to persuade the parts together with a hammer, or cut the blocks shorter after they've been attached to the legs.

2 Build the frames (E, F, G) for the top and bottom platforms, fastening the corner joints with 3½-inch exterior screws. Double up the (G) boards on the inside of the top platform's frame for the tubs. Check to make sure the openings on the ends of the top platform will accommodate your tubs. (You bought the tubs first, right?) If the openings are too large, use scrap 2-by-4s to fill in the extra space.

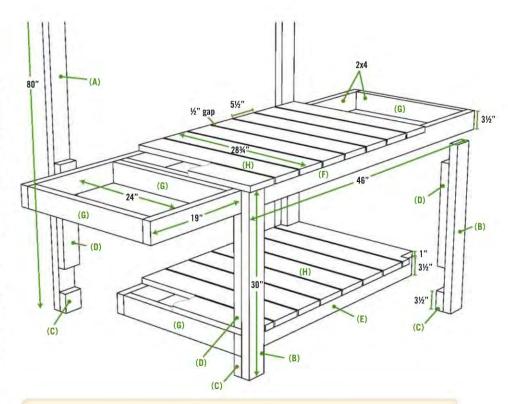
3 Make sure the platform frames are square, and then install the 1-by-6 slats (H) using 8d galvanized nails. Pre-drill the nail holes to prevent splitting. The top and bottom slats should overhang the frames by 13/4 inches. Notch the outer two slats on the bottom platform to fit around the front legs.

4 Lay the two back legs on a solid, flat surface, and fit the bottom platform into the notches you created between the blocks. Position the top platform on top of the middle leg blocks (D). Secure the platforms to the back legs with 3-inch exterior screws. Use construction adhesive, too, if you want to increase rigidity. Install the front legs and secure them in place with screws. The top slats should extend just a hair past the front legs.

Note: If all you need is a potting bench, your work is nearly done. Just add open shelves to the back uprights and support them with brackets. If you also want a storage cabinet with doors, keep reading. But first, refer to the cabinet materials and cutting lists on Page 52.

Cultivate the Cabinet

- 6 Knock together the box for your garden storage cabinet by securing the bottom, top and shelves (K) to the cabinet sides (J) using 3½-inch exterior screws. You can alter the spacing of the shelves according to your needs.
- 6 Check the cabinet box to make sure it's square by measuring the diagonals (if the measurements are equal, then the box is square). Install the tongue-andgroove backboards (L). You'll need to rip the last board lengthwise to fit.
- Secure the cabinet top cap (M) in place. Position it so the back edge is flush with the back of the tongue-andgroove boards, and the ends overhang the sides equally.
- 8 Install the 2-by-2 door divider (T). Measure from the edge of the cabinet to the divider and make your doors about 1/4-inch smaller in width. Fit five of the 1-by-6 tongue-and-groove boards (N) together to create a door panel that's wider than you need. Mark out the width of the actual door on this panel before separating the boards and ripping one or both end boards to width so the door will be the correct width when the boards are reassembled. Fit the boards together again and lay them on top of the cabinet opening to make sure they're the right dimensions.
- Place 1-by-4 battens (O) near the tops and bottoms of the doors of your storage cabinet. Check to make



BENCH MATERIALS LIST

Ten 2-by-4s, 8 ft. long 4 decking boards, 10 ft. long Exterior screws, 31/2" Exterior screws, 3" 10d galvanized nails 8d galvanized nails Construction adhesive

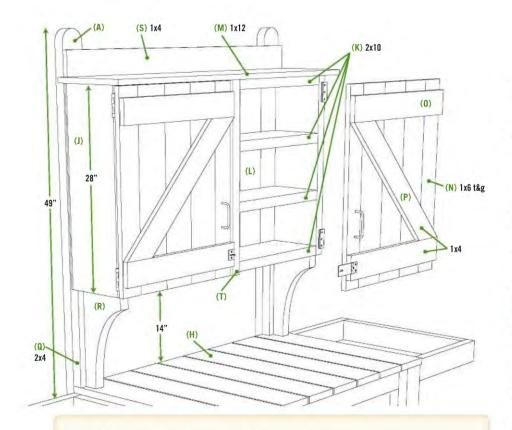
BENCH CUTTING LIST

2 back legs (A), 11/2" x 31/2" x 80" 2 front legs (B), 11/2" x 31/2" x 30" 4 bottom leg blocks (C), 11/2" x 31/2" x 31/2" 4 middle leg blocks (D), 11/2" x 31/2" x 181/2" 2 front and back for lower platform (E), 11/2" x 31/2" x 46" 2 front and back for upper platform (F), 11/2" x 31/2" x 84" 8 platform crosspieces (G), 11/2" x 31/2" x 24" 16 platform slats, upper and lower (H), 1" x 51/2" x 283/4" decking*

*Most deck board material is a true 1 inch thick.



The upper platform's slats should extend slightly past the potting bench's front legs (Step 4).



CABINET MATERIALS LIST

Two 2-by-10s, 12 ft. long 5 tongue-and-groove 1-by-6s, 10 ft. long One 1-by-12, 4 ft. long Three 1-by-4s, 8 ft. long One 2-by-4, 3 ft. long One 2-by-2, 3 ft. long Exterior screws, 31/2" Exterior screws, 11/4" 4 no-mortise hinges, 3" 2 cabinet pulls with screws 1 door hasp with screws

CABINET CUTTING LIST

2 sides (J), 11/2" x 91/4" x 28" 4 top/bottom/shelves (K), 11/2" x 91/4" x 43" 9 backboards, tongue-and-groove (L), 3/4" x 51/2" x 28" 1 top cap (M), 3/4" x 111/4" x 48" 10 door boards, tongue-and-groove (N), 3/4" x 51/2" x 28" 4 door battens (O), 3/4" x 31/2" x 23" 2 door cross battens (P), 3/4" x 31/2" x cut to fit 2 upper leg blocks, back only (Q), $1^{1/2}$ " x $3^{1/2}$ " x 14" 2 support brackets (R), 11/2" x 91/4" x 12" 1 top rail (S), 3/4" x 31/2" x 46" 1 door divider (T), 11/2" x 11/2" x 28"



The author demonstrates how to secure the doors to the cabinet with 3-inch hinges (Step 10).

sure everything fits, and then secure the battens to the tongue-and-groove door boards (N) with 11/4-inch exterior screws. Lay the cross battens (P) into position, mark them, cut them to the correct angle and length, and then secure them with 11/4-inch screws.

10 With the garden storage cabinet still on its back and the doors in place, secure the doors to the cabinet using 3-inch hinges - two hinges per door. Install pulls for opening the doors and a hasp for keeping them shut.

Graft the Cabinet to the Bench

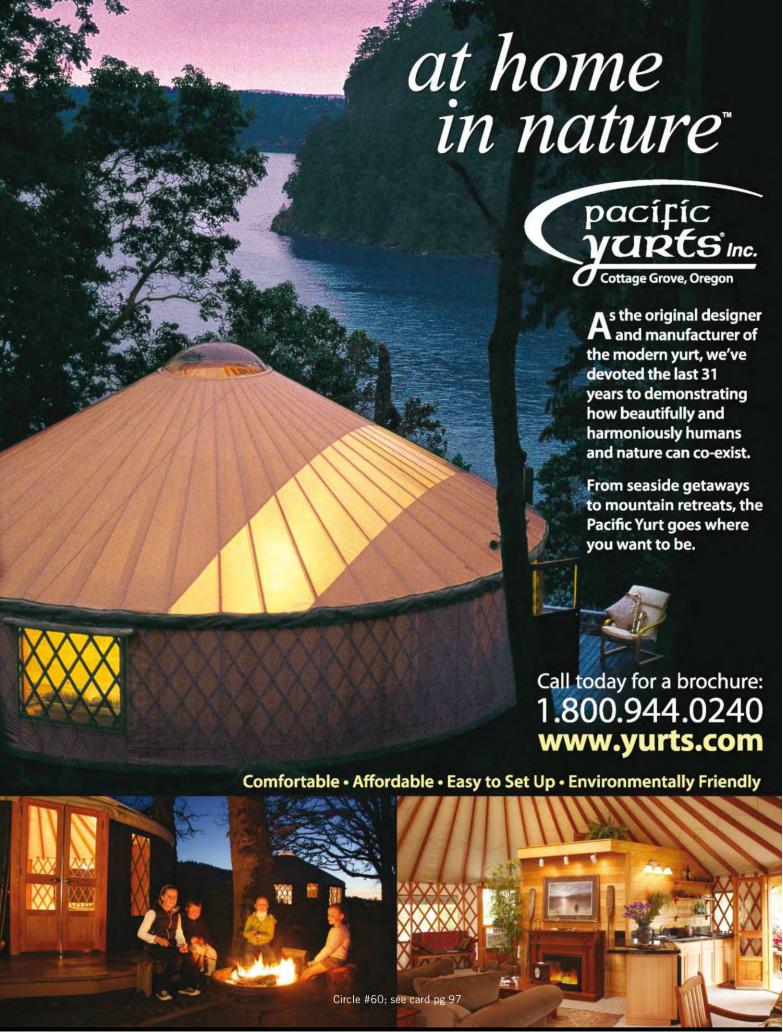
11 With the bench on its back, position the cabinet on the back legs (A) 14 inches above the top platform. Secure the cabinet to the legs by driving screws through the cabinet back and sides.

Cut the upper leg blocks (Q) and secure them to the back legs (A) to support the bottom of the cabinet.

(B) Create and install your own cabinet support brackets (R) or use commercial metal shelf brackets. Install the top rail (S) to add rigidity and to prevent objects placed on top of the cabinet from falling off the back.

To secure your finished garden potting bench - and prevent it from tipping over because of unequal loading or climbing kids and cats - you can anchor it to a wall, railing, tree or fence with screws. Or, you could secure the legs to a concrete slab with L-brackets and concrete fasteners. To stop the soil or potting materials in the tubs from turning into mud, save the plastic tops and snap them in place when you're finished for the day. You can also drill a few holes into the bottom of each tub to provide drainage.

Spike Carlsen is a master carpenter who's been immersed in the wonderful world of wood for 30 years. These practical plans are among the 76 ingenious ideas offered in his DIY guide The Backyard Homestead Book of Building Projects (available on Page 80).





THE NEW URBAN AGRICULTURE

Farmers inside city limits are growing a lot more than food—they're also cultivating change.

By Rebecca Solnit

he anti-war poet and soldier Siegfried Sassoon reports that toward the end of World War I, Winston Churchill told him that war is the normal occupation of man. Challenged, Churchill amended this to "war — and gardening." Are the two opposites? Some agriculture is a form of war, whether it's clear-cutting rain forest, stealing land from the poor,

contaminating the vicinity, or exploiting farmworkers, and some of our modern pesticides descend from the chemical warfare breakthroughs of World War I. But gardening represents a much wider spectrum of human activity than war.

Could it be the antithesis of war, or a cure for social ills, or an act of healing the divisions of the world? When you tend your tomatoes, are you producing more than tomatoes? We are in an era when gardens are front and center for hopes and dreams of a better world, or just a better neighborhood—or the fertile space where the two become one. There are farm advocates and food activists, progressive farmers and gardeners, and, maybe most particular to this moment, there's a lot of urban agriculture. These city projects hope to overcome the alienation of food, of labor, of embodiment, of land; the conflicts between production and consumption, between pleasure and work; the destructiveness of





New York City rooftop gardens, two ways: Brooklyn Grange uses Rooflite growing medium at two sky-high locations, totaling 2.5 acres of veggies and a 30-hive apiary (left), while the Hell's Kitchen Farm Project plants in kiddie pools with wire covers to prevent poaching by pigeons (right).

industrial agriculture; the growing problems of global food scarcity and seed loss. The list of ideals being planted, tended and sometimes harvested is endless, but the questions are simple: What crops are you tending? What do you want to grow? Community? Health? Pleasure? Hope? Justice? Gardens represent the idealism of this moment and its principal pitfall, I think. A garden can be, after all, either the ground you stand on to take on the world or how you retreat from it, and the difference is not always obvious.

Production with Purpose

This second Green Revolution is an attempt to undo the destructive aspects of the first one, to make an organic and intimate agriculture that feeds minds and hearts as well as bodies, that measures intangible qualities as well as quantity. By volume, it produces only a small percentage of this country's food, but of course its logic isn't merely volume. The first Green Revolution may have increased yield in many cases, but it also increased alienation and toxicity, and it was efficient only if you ignored its fossil fuel dependency, carbon output and other environmental impacts. It was an industrial revolution for agriculture, and what is happening now is distinctly postindustrial, suspicious of the big and the corporate, interested in the alternatives. This is more than a production project; it's a reconnection project, which is why it is also an urban one—if we should all be connected to food production, food production should happen everywhere, urban and rural and every topsoil-laden crevice and traffic island in between.

Today, major urban agriculture projects are firmly rooted in Burlington, Philadelphia, Detroit, Milwaukee, Chicago, Oakland, Los Angeles, San Francisco and dozens of other U.S. cities. Sales of vegetable seeds have skyrocketed across the country. Backyard chickens have become a new norm, and schoolyard gardens have sprung up across the nation. Organic farms and farmers markets have proliferated, and for the first time in many decades the number of farmers is going up instead of down. Though those things can be counted, the transformation of awareness that both produces and is produced by all those things is incalculable.

We think more about food, know more about food, care more about food than we did 20 or 30 years ago. Food has become both an upscale fetish and a poor people's radical agenda, a transformation of the most intimate everyday practices that cuts across class — though it has yet to include all of us. The inner city is still a food desert: a place where access to decent food, or even to food, is not a given.

Thought of just as a means of producing food, the achievements of urban agriculture may be modest, but as a means of producing understanding, community, social transformation

and catalytic action, they may be the opposite. When they're at their best, urban farms and gardens are a way to change the world. Even if they only produce food—it's food. And even keeping the model and knowledge of agriculture alive may become crucial to our survival at some later point. Food is now a means by which a lot of people think about economics, scale, justice, pleasure, embodiment, work, health and the future. Gardens can be the territory for staking out the possibility of a better and different way of living, working, eating, and relating to the world.

The rise of chickens, bees and other agrarian phenomena in the city means that cities are now trying to craft ordinances to govern all aspects of food production, from backyard chickens and goats to the

slaughter of animals raised for food. In Minneapolis, plastic hoop houses have come up for consideration—though some think of them as an eyesore, others consider them useful occupants of vacant lots. Part of what is at stake is redefining the urban environment: Do we want to see food produced? There are beautiful gardens; there are also compost, manure and other less decorative aspects, including animal butchery.

Nowadays, though a surprising number of young idealists take on the grueling work of running an organic farm in the country, there is no longer such a strong sense of separation, and urban agriculture is what might be newest about this new green revolution. Urban also means that it stays small, for the most part, and

that it engages with what cities have, both good and bad. That means, among other things, hunger, health issues, race, poverty and alienation, as well as diverse cultures, lively engagements and cross pollinations.

Growing Community: City Slicker Farms

In 2001, a young woman who'd grown up in the Bay Area's agrarian Sonoma County decided the abundance of vacant lots and the dearth of decent food sources in impoverished, isolated West Oakland, Calif., had a clear solution. Willow Rosenthal started City Slicker Farms there, a thriving project that started with people and then figured out how to work with the land. Though they farm several leftover and abandoned par-



City farmers in Detroit, the locus of urban farming, attend a seedling distribution.

cels of land in the neighborhood, their most impressive achievement is setting up residents to become backyard gardeners. They provide soil testing and the materials to get started, share labor at the outset, and then provide two years of technical assistance so that the gardens keep thriving. Local residents donate their underutilized lots, where staff and volunteers work and where neighbors come by to chat and check out the chickens or the beets. Some of the land has even been set up to create hangout places. The public sites produced more than 7,000 pounds of food in 2013, but the Backyard Garden program produced nearly 30,000 pounds. It's not feeding the entire community, but it's modeling the ways such a project could scale up to become a major source of food and a

transformation of place.

The food is great, the community relations seem to be thriving, and yet the project faces the same problem so many people in the neighborhood do: money. They have to raise it, there's never enough, and there's no self-sufficiency in sight for the staff of eight and the public farms, whose food is sold at farmstands on a sliding scale from free to full price. Because they're farming skills, hope and community as much as lettuce, there's no way to put a price on what they produce.

You might say that the Bay Area has these kinds of projects because it's the Bay Area, and it's true that the wider community is exceptionally affluent. West Oakland is home to many low-income families who, because of the surround-



June 1944, New York City: A school's wartime victory garden on First Ave.



Members of 180-plot Stanford-Avalon Community Garden in Los Angeles (above) and volunteers at City Slicker Farms' stand in Oakland, Calif. (right) reap relationships.



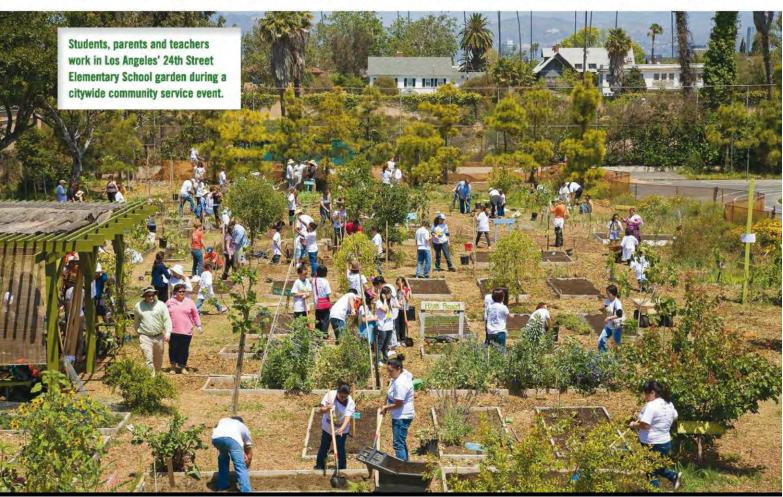
ing wealth, are confronted with rising property costs—which makes access to land exceptionally difficult. City Slicker Farms' recent acquisition, about 1.4 acres located in the heart of West Oakland, is an attempt to contend with this challenge.

Places such as Philadelphia and, most famously, Detroit have the opposite situation: a fairly dire economy but lots of available land to cultivate. In 2006, when I went to look at Detroit's postruin landscape of agriculture and weedy nature, I was amazed the city even then had 40 square miles of abandoned open space—places where the concrete or asphalt was mostly gone, along with the buildings. The city had a verdant green hole in it nearly the size of San Francisco, and that hole was being filled in a little with community gardens and small farms. The place was,

in some profound sense, post-urban. It had the space to do what West Oakland's farmers dream of: grow *a lot* of its own food.

Detroit without money and jobs looks like the future that may well eventually arrive for the rest of us, and its recent experiments in urban agriculture were attempts to figure out how to survive. Much of the gardening that is now often educational or idealistic may soon come to meet practical needs in the United States, and given the rising levels of hunger in this country, it's necessary now. In Detroit, a significant number of people get a meaningful amount of their annual diet from gardens. Clearly there is room to increase this informal do-it-yourself food supply.

The victory gardens model suggests how prolific backyard and urban gardeners can be and how, scaled up, they can become



major contributors to feeding a country and to food security. A 2011 study by Sharanbir S. Grewal and Parwinder S. Grewal of Ohio State University envisioned what it would look like for Cleveland—another Rust Belt city with lots of potential green space and lots of hungry people—to feed itself. The most ambitious proposal included 80 percent of every

vacant lot, 62 percent of every commercial and industrial roof, and 9 percent of every occupied residential lot, which could provide up to 100 percent of the city's fresh produce, along with 94 percent of its poultry and eggs, and 100 percent of its honey. It would keep up to \$115 million in food dollars in the city, a huge boon to a depressed region.

Clearly what might work in Detroit or Cleveland or Oakland is not so viable in superheated Phoenix or subarctic Anchorage. And then climate change can upset these enterprises as much as it can any agriculture. In 2011, the 46-acre Intervale Community Farm in Burlington, Vt., was devastated by torrential rain that washed out soil as well as plants. Spring deluges interfered with plant-



The Community Vehicular Reclamation Project in Toronto turns cars into gardens in an effort to reclaim streets for pedestrians and plants.

ing; Hurricane Irene did in many of the fall crops.

In an increasingly uncertain time, what *is* certain is that agriculture has invaded cities the way that cities have been invading agriculture for the past several centuries, that the reasons for this are as manifold as the results, and that the peculiar postwar affluence is over for most of us, and everything is going to become a little

more precarious and a little less abundant. Given these circumstances, urban agriculture has a big future. Another lesson from the victory gardens is, with seeds and sweat equity, a lot can happen quickly: If the need to grow food arises, as it did during World War II, the gardens will come.

Revolutionary Plots

You could argue that vegetable seeds are the seeds of the new revolution. But the garden is an uneasy entity for our time, a way both to address the biggest questions and to duck them. "Some gardens are described as retreats, when they are really attacks," famously said the gardener and artist Ian Hamilton



Circle #63; see card pg 97

Finlay. A garden as a retreat means a refuge, a place to withdraw from the world. A garden as an attack means an intervention in the world, a way in which the small space of the garden can participate in the larger space that is society, politics and ideas. Every garden

negotiates its own relationship between retreat and attack, and in so doing engages the political questions of our time.

But you can't have a revolution where everyone just abandons the existing system—it'll just be left to the opportunists and the uncritical. Tending your own garden does not, for example, confront the problem of Monsanto. The corporation that developed genetically modified organisms as a way to promote its pesticides and that is now trying to control seed stock worldwide is a scourge. Planting heirloom seeds is great, but someone has to try to stop Monsanto, and that involves political organizing, sticking your neck out and confrontation. It involves leaving your garden. Which farmers have done—in 2004 the wheat farmers of North Dakota defeated Monsanto's plans to introduce genetically modified wheat worldwide. But they didn't do it by planting heirloom organic wheat or talking to school kids about what constitutes beautiful bread or by baking. They did it by organizing, by collective power and by political engagement. The biggest problem of our time requires big, cooperative, international transformations that cannot be reached one rutabaga patch at a time.

Compost old divisions. Nurture relationships. Plant hope, subversion and fierce commitment.

Feeding the hungry is noble work, but figuring out the causes of hunger and confronting them and transforming them directly needs to be done, too. And while urban agriculture seems like a flexible, local way to adapt to the hungry, chaotic world climate change is

bringing, we all need to address the root causes directly. Maybe there's something in the fact that the word "radical" comes from the Latin for "root"; the revolutionary gardener will get at the root causes of our situation, not just cultivate the surface.

Churchill cast gardening and war as opposites because he saw gardening as a retreat into a peaceful, private realm. Our age demands engagement. City Slicker Farms produces it as one of their crops. You could imagine the whole world as a garden, in which case you might want to weed out corporations, compost old divides, and plant hope, subversion and fierce commitments among the heirloom tomatoes and the chard. The main questions will always be: What are your principal crops? And who do they feed?

Writer and historian Rebecca Solnit is the author of 15 books about the environment, landscape, community, art, politics, hope and the power of stories. This piece was condensed from her article "Revolutionary Plots" in Orion, July/August 2012.





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GARDENER'S FIRST AID What Works and Why

Follow these simple, safe and effective remedies for soothing sunburns, blisters, bug bites and other minor maladies.

By Linda B. White, M.D.

auling compost, digging garden beds and wrangling ornery livestock are just a few of the farm and garden tasks that can be hard on your body. Even the healthiest homesteaders are susceptible to bee stings and sunburns. Fortunately, your home is probably already stocked with simple cures for minor woes. The following remedies are adapted from 500 Time-Tested Home Remedies and the Science Behind Them co-authored by Barbara Seeber, Barbara Brownell Grogan and me (available on Page 80), and they'll soothe everything

from bug bites and bumped shins to blisters, burns and back pain.

Poisonous Plants: Ivy, Oak and Sumac

Prevention. The best way to protect yourself from this itchy, blister-causing trio is to wear protective clothing, in-









Gel from aloe leaves (left) works wonders on burns, and the leaves of comfrey (middle) and plantain (right) help topical wounds heal quickly.

cluding pants, long sleeves and gloves, whenever you work in areas where these plants may grow. Anytime you think your skin or clothing may have made contact with their leaves, immediately remove and wash your clothing in hot water and take a shower. If you know your hands or arms touched the leaves, wash these areas as soon as possible with a skin cleanser, such as Tecnu, which is designed to remove the blister-causing urushiol oil that these plants produce. Some people are severely allergic to these plants, while others are totally immune. If you know you're allergic, you may want to apply a preventive barrier cream, such as Ivy X Pre-Contact Skin Solution, before working outside.

Treatment. If you do develop a bad rash with blisters, an oatmeal bath or paste may relieve the itching. Oats (Avena sativa) have antioxidant and anti-inflammatory properties. Applied topically, oats moisturize the skin and decrease itching. To draw an oatmeal bath,

pour 2 to 3 cups of rolled or colloidal oats into a sock, cloth, bag or bandana to contain the particles and help with cleanup. (You can make colloidal oats in your food processor by blending oats to a powder.) Place the sock in a tub full of warm water. Climb in and soak for at least 15 minutes. Avoid using soap, which will only dry and further irritate your skin.

To make an oatmeal paste, combine 1 tablespoon of colloidal oats with 1 teaspoon of baking soda. Gradually add just enough water to form a paste and mix well. Apply to irritated areas. After it's dry, rinse the paste off with warm water.

Bug Bites and Stings

Treatment. Lavender (Lavandula angustifolia) is anti-inflammatory, analgesic (pain-killing) and calming. Keep a frozen lavender-infused cloth or a simple lavender and baking soda paste on hand for the next time your path collides with a poisonous, panicky pollinator.

To make a lavender-infused frozen cloth, wet a washcloth with water and wring out the excess moisture. Squeeze 5 drops of lavender essential oil on the wet cloth, place it inside a resealable bag, and store it in the freezer. When you get stung, remove the cloth from the bag and apply it directly to the inflamed area. It will help reduce swelling and relieve pain.

Oats have antioxidant and anti-inflammatory properties that help soothe itchy skin.

You can also try a mixture of 3 drops of lavender essential oil and 1 teaspoon of baking soda, which is thought to help neutralize the acidic venom in bee and fire ant stings. Add enough water to the mixture to form a paste, and plaster the paste over the sting. Remove the paste after about 30 minutes or after it's dry. Reapply as needed.

Plantain (Plantago major) is a common weed-not to be confused with the banana-like fruit—that contains pain-relieving, astringent and mildly antibacterial substances, a trio of traits that are beneficial for healing insect stings and minor

abrasions. A 2012 study showed that skin tissue in mice healed faster when plantain was applied, compared with controls.

The next time you get a bug bite or small wound, gather five to 10 plantain leaves and mash them with your fingers to release the beneficial tannins. Apply the juicy pulp to the affected area for about 30 seconds. Repeat as needed.

Burn Relief

Prevention. For gardeners, the main causes of burns are ultraviolet radiation (sunburn) and friction (blisters). You can prevent the former by wearing protective clothing, a floppy hat and sunscreen. Avoid the latter by wearing good gloves,

> using tools that fit you and the job at hand, and avoiding prolonged, repetitive movements. When preventive measures fail, however, these remedies help.

> Treatment. Scientific studies show that honey, an ancient woundhealer, is antibacterial and speeds healing of burns better than con-

ventional burn dressings containing silver sulfadiazine. Using a clean butter knife, spread organic, high-quality honey on a piece of sterile gauze large enough to cover the burn. Tape the edges of the gauze in place so the bandage is comfortable. After six hours, remove the dressing, gently rinse the skin, and reapply a fresh strip of the honey-coated gauze.

Tea (Camellia sinensis) compresses are a time-honored treatment for sunburns. Tea is anti-inflammatory, antioxidant, antibacterial and astringent. Compared with black tea, green tea has stronger antioxidant and antibacterial effects. If you want

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to use an herbal tea, German chamomile is antioxidant, anti-inflammatory, antimicrobial and wound-healing.

To make a tea compress, bring a halfcup of water to a boil. Pour the boiling water into a mug and submerge the tea bag of your choice (green, black or chamomile). Let cool to room temperature. Dip a clean cloth into the tea and lay the cloth on your burn until pain subsides.

Aloe (Aloe vera) is anti-inflammatory, promotes circulation, and inhibits bacterial and fungal growth. Most studies show that aloe speeds healing of burns and wounds. Keep an aloe plant on your windowsill so you can squeeze the fresh gel from a leaf, or look for a product that's at least 90 percent pure aloe. Apply pure aloe gel to the burn, or blend 1 tablespoon of gel with 10 drops of lavender essential oil.

Blisters—to pop or not? The skin on top of a blister and the fluid underneath protects the fragile new skin below. The fluid absorbs into skin on its own, so the general rule is not to puncture. On the other hand, if the blister is large, irritating or painful, you may wish to drain it. To do so, wash your hands and sterilize a needle by heating it in a flame. After it cools, insert the needle into the blister and gently

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massage out the fluid. Do not remove the flap of skin. Apply an antibiotic cream or ointment, and then cover the area with a bandage. Call your doctor if signs of infection develop, such as yellow discharge or red lines leading away from the blister.

Cuts and Scrapes

Treatment. Comfrey (Symphytum officinale) leaves and roots contain allantoin, which helps the regeneration of new skin cells. Research has shown that abrasions heal faster with topical comfrey relative to a placebo.

To use, wash the site of your wound thoroughly. Harvest a comfrey leaf and rough it up with your fingers. Place this backyard bandage against the wound. Secure it with a clean, damp cloth. Leave it in place for an hour before removing.

Sanitizing wounds with soap and clean, cool water is sufficient for minor scrapes and cuts. Stronger solutions, such as hydrogen peroxide or iodine, can actually irritate a cut, harm tissue and slow the healing process.

Sore Muscles

A 2012 clinical trial found that when virgin olive oil was applied topically to arthritic knees, it provided superior pain relief compared with an ointment containing the anti-inflammatory drug piroxicam. Turmeric and ginger are traditional Indian analgesic and anti-inflammatory agents. Cayenne contains capsaicin, which acts as a counterirritant (it initially causes a mild burning sensation, but then silences local pain nerves). Studies have shown that topical capsaicin reduces pain from osteoarthritis, rheumatoid arthritis and back pain.

Treatment. For a pain-relieving poultice, blend 1 tablespoon each aloe gel and unfiltered, extra-virgin olive oil, 2 teaspoons each ground turmeric and ground ginger, and 1 teaspoon ground cayenne pepper. Spread the paste over the painful area. Hold it in place with cloth or plastic wrap, and remove after 30 minutes. Turmeric will stain clothing and temporarily tinge your skin. Wash your hands and avoid touching your eyes or other sensitive areas after handling cayenne powder.

Heat-Related Ailments

Prevention. Working outside during summer months can heighten the risk of heat stroke and heat exhaustion. Garden in the relative cool of morning and evening. Wear thin, loose, light-colored clothing, a wide-brimmed hat and gloves. Drink plenty of water. Keep an eye out for warning signs of heat exhaustion, such as dizziness, weakness, nausea and vomiting. Rather than looking flushed, your skin may be pale, warm and damp.

Treatment. At the onset of symptoms, the best strategy is to quit working, move to the shade or indoors, remove clothing, and drink fluids. Go easy on yourself, and remember: Tomorrow is another day.

Linda White, M.D., usually remembers to wear gardening gloves when plunging her hands in soil. She keeps a potted aloe plant and lavender essential oil on hand for minor injuries.



Circle #79; see card pg 97



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Circle #70; see card pg 97



THE RIGHT UTILITY VEHICLE for Your Homestead

These versatile, dependable machines make all sorts of country chores easier.

By Todd Kaho

hey're fully evolved and they're here to stay. I'm not talking about some invasive insect, but rather about off-road utility vehicles (UTVs), which are now available in scores of models from a number of manufacturers. Originally developed for a few specialized industries, these rugged machines have become go-to choremasters for modern homesteaders. Also known as "side-by-sides," UTVs are

perfect for getting around acreage and boldly going where a pickup truck or tractor ought not tread, and they have a smaller environmental footprint as well.

Workhorse of a Different Color

UTVs aren't intended to completely replace a tractor or truck, but they can perform many of the same functions, and they boast the added benefit of ATV-like nimbleness. Unlike traditional ATVs (all-

terrain vehicles), though, a UTV carries its passengers in side-by-side fashion, and anyone who can drive a car can easily maneuver a UTV.

As their name implies, UTVs are designed to be utilitarian. The general layout is a compact pickup truck configuration, with passenger seating in front of a small bed. Though the bed is modest compared with that of a full-sized pickup, it's plenty big enough to be of value around a homestead. The beds of nearly all UTVs come







Bobcat's Toolcat 5600 can be outfitted with more than 40 attachments (above). The RTV-X900 from Kubota packs the muscle of a 21.6-horsepower diesel engine (left).

equipped with a dump feature (some are powered), which boosts their usefulness.

UTVs can pull mowers, tillers, planters and other implements, move snow, grade earth, and do all manner of hauling. Several of the heavy-duty commercialgrade UTVs can even provide hydraulic power to accessories (some come fitted with loader capability in front), and some offer three-point hitch and power take-off (PTO) capabilities.

Practical Pulling

Most UTVs are powered by an efficient four-stroke, single- or twin-cylinder gaso-

line engine. For more demanding applications, certain UTVs can be ordered with a diesel engine, which may prove well worth the premium if you'll be logging a lot of hours on the vehicle or already have a diesel pickup or tractor. And, once a novelty, battery-powered UTVs are now a viable option wholly qualified to tackle your toughest tasks (see below). Most can be fully charged overnight or faster.

Don't shy away from UTVs that use some form of the continuously variable belt-drive transmission (CVT). This transmission relies on centrifugal force to vary the effective "gear" ratio between the

drive pulley and the driven pulley, and the proven technology is reliable, lightweight and relatively inexpensive. Some of the higher-end UTVs feature robust hydrostatic transmissions, which are extremely heavy-duty but come at a price.

Because UTVs are meant to be used off-road, four-wheel drive is standard on many models. And if the going frequently gets tough and your payloads are typically substantial, consider a 6x6 machine. That's right—six wheels doing the pulling.

When you require maximum traction from your UTV, a locking differential will keep power to the ground, whether you've

Test-Driving the Polaris Ranger Electric UTV

I recently wrapped up a trial of the Polaris Ranger EV, during which this vehicle spent more than a year as the go-to utility machine on my sheep and cattle ranch in east-central Kansas.

The Ranger was ready to go no matter the weather or the season (as long as I remembered to plug it in, of course). The incredible

torque of the electric motor and its different "range" settings offered sure-footed towing and hauling ability through snow, mud, and sloppy and soggy corrals, and all over my pastures. I put the machine to work hauling fencing supplies, minerals and people. I also used it for herd and flock checks, and it was invaluable for rounding up animals.

One of the perceived drawbacks of electric vehicles is their range. The Ranger never ran out of battery juice during my normal use of it, however-although I did intentionally run down the batteries to test the "limp" function, which worked beautifully to get me back to the barn.

Compared with the gasoline-powered Ranger I'd tested previously, the EV had a slower top speed, but that was fine with me. It was also notably quieter, and it came without exhaust fumes, spilled gasoline, and all the other inconveniences associated with an internal combustion engine. If you're ready to purchase a UTV for work and moderate recreation, be sure to investigate the Polaris Ranger EV, among other electric UTV options on the market.

-Oscar H. Will III



The electric Polaris Ranger has on-demand all-wheel drive and a 500-pound-capacity box.

chosen a 2x4, 4x4, 4x6 or 6x6 model. If you plan to use the vehicle on steep terrain or to pull stumps, look into a model that has a dual-range, high-low transmission.

Decisions, Decisions

Narrowing the field of options down to a manageable number is the best way to begin your UTV hunt. To do this, carefully consider your needs and how you'll employ the vehicle.

Just about any UTV will fit the bill if you simply need to haul a few bales of hay to the far pasture or will use the machine primarily to ride fence lines. On the other hand, if you move heavy or bulky cargo on a regular basis, inspect the bed capacity and examine the size of the cargo area of each prospective model. Also figure in passenger capacity. Most UTVs have either two bucket seats or a bench seat up front, and several models offer a second-row bench to carry the whole crew.

Next up, determine the powertrain and drivetrain that will work best for your intended applications. Sufficient power is seldom an issue with modern UTVs, but if you plan to work hard or play hard, ensure the model you pick packs plenty of punch.

If you need to operate in a muddy field, over trails, or through snow on steep hills, then four-wheel drive or six-wheel drive and a locking differential will get you where you need to go and offer safer operation. Plan to plow snow? Check into which models offer accessory plows, and make four-wheel drive a priority in your search. Don't own a tractor and want a UTV to help fill the void? Consider a heavier machine with hydraulic frontloader and PTO capabilities.

Be aware that top speed has become a big selling point for some UTV manufacturers as they aim to serve off-road recreation and racing enthusiasts. If you plan to use your machine for more leisurely off-road work and recreation, do you really want to pay a premium price for a 50-mph-or-higher, top-end machine?

The final important consideration is dealer location and reputation. Most UTVs are quite durable and designed to

take a beating, but, like any vehicle, they do require regular service, so think twice about buying a particular brand if the nearest dealer is several hours away. If you have a history with a local Bobcat, Cub Cadet, John Deere, Kubota, Polaris or other dealership and you trust the dealer to treat you fairly, then you're one step ahead of the game. Even if you intend to do your own UTV maintenance, parts availability is another factor that will make having a dealer in the vicinity advantageous.

Happy Hunting

After you've zeroed in on a few models and have arrived at the dealer to kick tires, don't hesitate to ask for a demo drive. Operating a UTV is the best and quickest way to find out what it's like to drive, and to investigate aspects you can't determine from facts and figures alone, such as whether a model is objectionably noisy.

Regardless of make or model, if you take the plunge on a new UTV, you'll gain a hardworking companion that will change the way you look at your "chores." 📆





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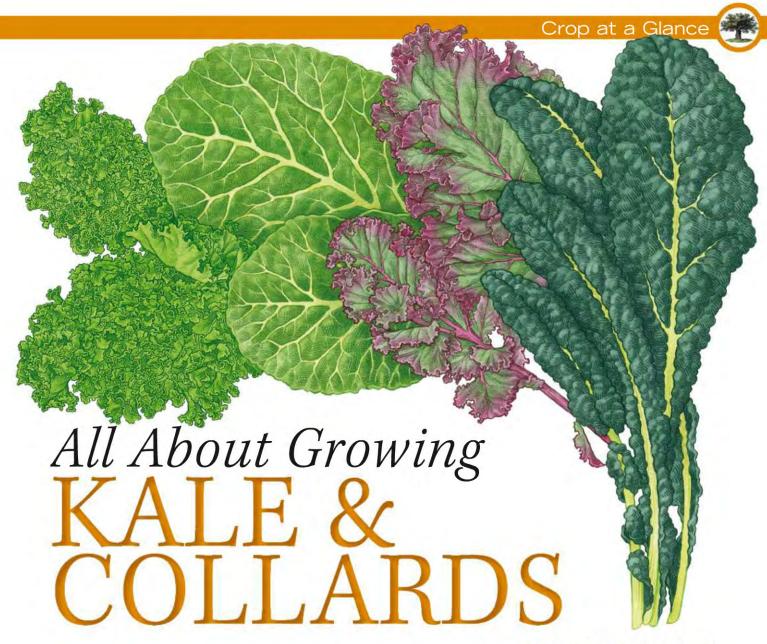






Circle #50; see card pg 97





By Barbara Pleasant Illustrations by Keith Ward

wo of the easiest-to-grow crops in the cabbage family, kale and collard greens are closely related, super-nutritious veggies that have similar cultural requirements. You can grow quick crops of kale and collards in spring, while the weather is cool, and then plant them a second time in late summer for harvesting after temperatures drop in fall.

If you live where winter temperatures stay above 15 degrees Fahrenheit, kale and collards will grow right on through the chillier months. By sheltering these cold-hardy greens with row cover or a low tunnel, you can grow them through even lower temps. As true biennials, kale and

collard plants that survive winter will rush to produce flowers and seeds in spring.

Types to Try

Kale comes in several leaf shapes, textures and colors, and cold tolerance varies by type.

Curly kale (Brassica oleracea) varieties, including 'Winterbor' and 'Redbor,' feature leaves with rumpled, curled edges. This is the classic, most well-known type.

Russo-Siberian kales (B. napus) are the most cold-hardy and are an especially tender type favored by cooks. 'Red Russian' kale produces heavy yields of green-blue leaves with purple ribs.

Tuscan kales (B. oleracea), such as 'Lacinato,' bear long, narrow, dark-green leaves with a waffle-like texture.

From left: curly 'Winterbor' kale, 'Georgia' collard greens, Russo-Siberian 'Red Russian' kale and Tuscan 'Lacinato' kale.

Collard greens (B. oleracea) vary in leaf color and texture, as well as regional adaptation. 'Georgia' collards grow well in the sandy soils of the Gulf Coast, while 'Champion' and other strains bred in Virginia perform better where winters are cold.

Try 'Green Glaze,' which has bright green leaves and is slow to bolt, if you want a variety that tolerates heat and cold, and is not preferred by cabbageworms.

How to Plant

You can grow kale and collards from seeds sown directly into prepared soil, but, especially in spring, it's best to start seeds



Harvesting and Storage

Begin harvesting when plants' leaves are larger than your hand, breaking off the older, bigger leaves first, as you need them for cooking. Harvest from the outer leaves, as new leaves will continue to grow from the plants' centers. After plants' leaves have reached a harvestable size, most varieties will yield three leaves per plant every five days.

Leaf quality is best in fall, after plants have been exposed to a few light frosts and have lost some of their bitterness. These are the ideal leaves to blanch and freeze for long-term storage. You can also dry kale and collard greens into snackable chips.

indoors and set them out under cloches four to six weeks before your last spring

frost. As long as they are protected from frigid winds, kale and collards transplanted into cool soil will quickly establish themselves and start growing.

Kale and collards grown in spring often become magnets for pests in early summer, so many gardeners pull up the plants and compost them. Then, in July or August, you can start new seedlings to serve as your fall-to-winter crop.

Recommended seed-starting dates for cultivating kale and collards as a fall crop include late June in New Hampshire, early July in Maryland, late July in Alabama, and late August in Arizona. Harden off the seedlings before setting them out in well-prepared soil, and plan to cover them with lightweight row cover or tulle to exclude insect pests and provide a little bit of shade.

Kale and collard plants are heavy feeders that grow best in moist, fertile soil with a pH between 6.0 and 7.5. Mix in a generous application of a balanced organic fertilizer before planting, and allow at least 12 inches between plants. Use a biodegradable mulch of grass clippings or coarse compost to insulate the roots from heat and drought in summer and cold in winter.

Pest Control

Featherweight row cover held aloft with hoops or stakes is the easiest way to protect actively growing kale and collard greens from cabbageworms, harlequin bugs, grasshoppers and other summer insects. After you've removed the row cover and have begun harvesting, monitor plants closely for pest problems, and, if needed, use an organic pesticide containing either Bt (*Bacillus thuringiensis*) or spinosad to limit damage from leafeating pests.

Saving Seeds

Kale and collard greens produce yellow flowers (which are scrumptious in salads or stir-fries) followed by elongated seedpods in their second year. When the seedpods have dried to tan, gather them in a paper bag, and allow them to continue drying indoors for a week. Shatter the dry pods, and collect the largest seeds for replanting. Under good conditions, seeds from kale and collards will remain viable for up to three years. Be sure to save seed only from open-pollinated varieties, because seed from hybrid varieties will not grow true to type.



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- In-home freeze dryer from Harvest Right.
- Waterwise 4000 water distiller and two Showerwise showerheads from Waterwise.
- Package of books from Storey Publishing.
- 25 newly hatched chicks and one starter kit from Murray McMurray.
- Traditional kitchen culturing package from Homesteader's Supply.
- Food dehydrator from NESCO.
- 4 rolls of SquareDeal non-climb woven fence from Red Brand.
- Chalet chicken coop from Egg Cart'n.
- Freeze-dried fruit and vegetable buckets from Hudson Valley Homestead and Provision.
- "The Hoss Deal" which includes a seeder, plow bonus, spreader bar bonus, 8- and 12-inch oscillating hoes, row marker, shoulder bolt, and seed plates from Hoss Tools.









Prize Package





















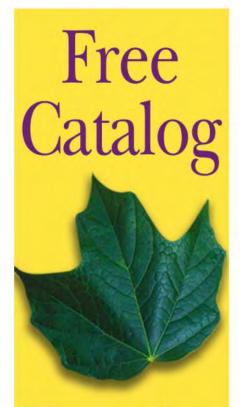




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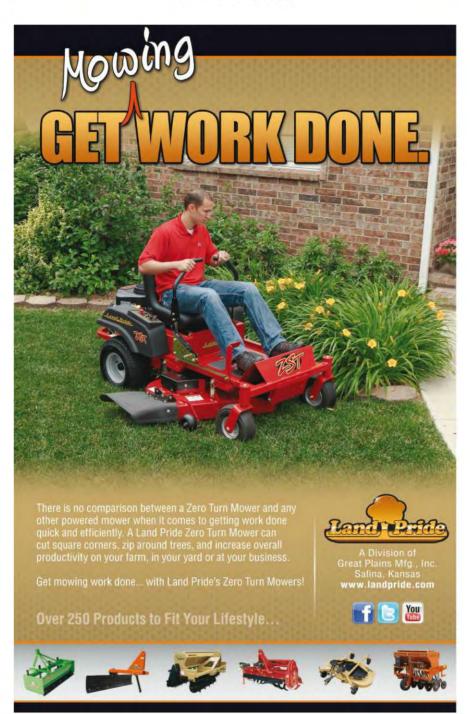
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www.musserforests.com

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Circle #55; see card pg 97





The Lowdown on ROTATIONAL GRAZING



The best pasture management mimics a natural migratory-herds-on-prairie ecosystem.

any years ago, the livestock on our farm consisted of a handful of cows and a couple dozen chickens. We've scaled up our livestock operations through the years with cash flow from retained profits, and now our farm is home to hundreds of cows and pigs, plus thousands of chickens and turkeys. The pastured model we've used with our livestock has proved successful at every level of growth.

Many times, micro-farmers see approaches such as our portable poultry pens and rotational grazing as practices that might be necessary for commercial

operations, but that aren't really applicable to their small homesteads (which some might consider glorified backyards). Nothing could be further from the truth.

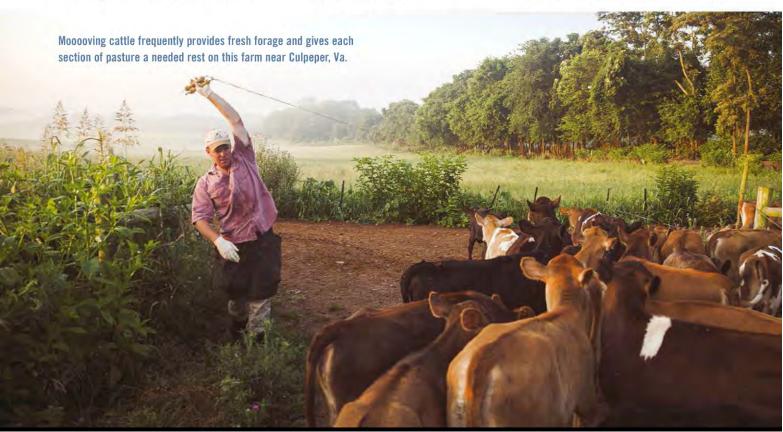
In this column, I address the homestead version of our farm's commercialscale rotational grazing system. In many ways, this type of forage management is actually easier for small enterprises than it is for large ones.

Two overriding principles drive pastured livestock operations, large or small:

- · Bare soil is not good.
- Strategically timed pruning stimulates plant growth.

Few things make my head explode faster than visiting a small farm and seeing a stationary chicken house surrounded by bare soil. No matter how small, the stereotypical yard with chickens scratching around in bare dirt is unhealthy. Removing the soil's vegetative cover makes it vulnerable to erosion and shuts down biological activity. That activity is important because the work of that community of beings, from earthworms to mycorrhizal fungi, prevents harmful pathogens from gaining the upper hand. A healthy, vegetation-covered, biologically active soil ensures plenty of the good bugs.

If you have a chicken yard the size of a postage stamp, covering the soil with



The Pitchfork Pulpit

wood chips, leaves, straw or compost will ameliorate the lack of vegetation and create a living medium even without green, growing plants. Chicken traffic in and out of a coop creates a high-impact zone and, even in totally freerange situations, will cause barrenness over time.

I saw an interesting solution in Canada, where a fellow put 2-by-4s edgewise on the ground about a foot apart, extending about 12 feet from the chicken house. He spread sturdy wire mesh - large enough for the chickens'

waste to pass through but small enough not to trap their feet—over these boards set on their edges. The eaves of the house drip dew and rainwater on this hightraffic zone, where the chickens concentrate manure. (They like to poop as they enter and exit their quarters.) Luxuriant green grass grows up through the wire



Chicken tractors help spread valuable manure throughout a pasture.

mesh and the chickens keep it mowed perfectly. What would otherwise be a toxic, pathogen-friendly, poopy mess is now a productive "salad bar" that looks like a beautiful green carpet. Separating the chickens from the ground by a mere 4 inches completely changed the hygiene of the environment—actually building soil instead of letting it erode. Very cool.

Prevent the 'Second Bite'

Of course, any chicken run larger than a postage stamp can enjoy a composting yard (lots of carbon bedding to cover the soil and let the chickens stir), or a portable structure that allows the birds to graze on fresh pasture continually. Whether you make or buy such a portable shelter, leaving the birds in one place for only a day will protect the surrounding vegetation and

stimulate greater growth. The chickens will enjoy the benefits of eating fresh green material without destroying plants or soil.

As with a mowed lawn, the pruned vegetation will grow back quickly as soon as it has rested. Quick pruning followed by long rest periods will stimulate more biomass production than would occur

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Circle #78; see card pg 97

in a static state. Even better than a lawn mower, the chickens leave behind fertilizer that will encourage the vegetation's regrowth—winner, winner, chickens' dinner! With larger flocks, employing lightweight, electric poultry netting will create the same win-win portability.

The secret to forage management is pruning and then allowing the vegetation to rest. Continuous animal access to any one place will eventually diminish forage production of the plants the animals like best. All animals have a palatability index-they, too, like their ice cream better than their spinach.

Many people with a 1-acre lot and one dairy cow ask, "Do I really need to rotate my cow?" The answer is, "Yes!" The first day the cow is on that 1-acre lot, she'll eat the most palatable, delectable plants out there. As soon as those newly sprouted plants grow back enough for her mouth to grab, she'll go for them again. The goal of proper forage management is to protect plants from that second graze through her salad-bar favorites.



These sheep enjoy rich nutrition, thanks to pasture that's benefited from plenty of recovery time.

After being pruned, plants need enough time to go through their growth curve-slow start, rapid acceleration, and then a senescent slow down as the plants mature. If your cow continuously grazes the same area, eventually the plants she likes will weaken and those she doesn't like will take over. When we domesticate animals on defined property, our responsibility is to figure out how to mimic the way migratory flocks and herds interact with the landscape. André Voisin, godfather of managed grazing, called this "the law of the second bite." In rotational grazing, you must delay that second bite until

the good forage has recovered sufficiently to regenerate, a period that will vary with the forage. Regardless of animal type, plant variety or the area's climate, the diversity of vegetation decreases in any area that's continuously grazed. This is why strategic timing is such a key to successful forage management.

Managed Grazing for the Micro-Farmer

The pasture plan for one milk cow would simply be to offer a tiny new paddock — maybe only 5 yards by 10 yards (50 square yards) - every day. If





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Circle #5; see card pg 97

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Strategic timing is the key to successful pasture management.

you have 1 acre, you could offer almost 100 of these daily paddocks. That would provide about 99 days of rest for each paddock between grazing times. The best forage plants and the rest periods will change based on day length and climate—weather conditions, rainfall and temperature. Fertility and type of vegetation will also play a role.

If your cow needs 50 square yards a day and you want to move her just once a week, she'd get a 350-square-yard paddock. Fast-growing grass could be tall enough to graze again in just two days, but that wouldn't be enough time for the plant to replenish the carbohydrates it needs to send forth new shoots and deeper roots. So even though less-frequent moves might seem more convenient, you won't get as much benefit as you would with shorter stays on smaller paddocks.

The paddocks don't need to be permanently fenced, but can be staked out as you move the animal around the pasture area. A portable electric fence is the high-tech Aha! of rotational grazing that enables the grazier to adjust the paddock barriers as forage volume and grazing requirements change.

Your bottom line should be to protect the forage from the second bite by allowing it a period of rest and fast regrowth immediately after the first bite.

RESOURCES

Graze: www.GrazeOnline.com

Holistic Management International:

www.HolisticManagement.org

National Resources Conservation Service:

www.NRCS.USDA.gov

National Sustainable Agriculture

Information Service, a project of the

National Center for Appropriate

Technology: www.ATTRA.NCAT.org

The Stockman Grass Farmer:

www.StockmanGrassFarmer.com

The result will be far more forage production, far more solar energy converted into biomass, more forage diversity, and more soil organic matter developed through larger root mass - which, by the way, removes carbon dioxide from the atmosphere and stores it in the soil. Plus, you get healthier animals and nutrient-rich meat and dairy products.

Custom Water and Shade

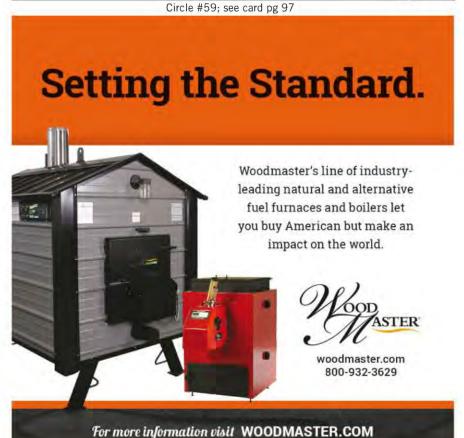
Managing rotational grazing requires portable water and, usually, portable shade. For example, a water line supplying a tub with a float valve is cheap and worth the investment. Simple, portable "shademobiles" you can make using greenhouse shade cloth will keep the animals away from trees (another high-impact zone, with bare soil and pathogen incubation) and will spread their droppings where the vegetation can metabolize this ecological gold. You'll want to customize both shade and water, depending on your circumstances and the season, and can find good advice online about how to do so, such as on the National Sustainable Agriculture Information Service's website (see "Resources" on Page 78).

Farmers now have access to inexpensive, lightweight, portable electric fencing as well as shelters and watering methods that enable us, for the first time in history, to duplicate domestically what occurs in the migratory-herds-on-prairie ecosystem that has worked well for countless centuries. What an incredible time to be alive! Exercising this level of management and care may sound arduous, but when you consider animal health, soil fertility, overall pasture productivity, human nutrition and even climate change, the dividends are clearly worth every bit of effort.

Now get 'em movin'.

Joel Salatin has been refining his rotational grazing methods for 30 years on his family farm in Virginia. His most recent books are Fields of Farmers: Interning, Mentoring, Partnering, Germinating; Folks, This Ain't Normal; and The Sheer Ecstasy of Being a Lunatic Farmer (see Page 80 to order).





MOTHER EARTH NEWS Bookshelf





THE ART OF FERMENTATION

The Art of Fermentation is an in-depth, comprehensive guide to do-it-yourself home fermentation. Sandor Katz presents the concepts and processes involved in fermentation in ways that are simple enough to guide readers through their

first experience making sauerkraut or yogurt, yet detailed enough to also provide greater understanding and insight for experienced practitioners.

#6077 \$39.95



TASTING THE SEASONS

Tasting the Seasons includes an impressive variety of fast, fresh, irresistible, easy recipes. These family-oriented one-dish wonders, updated classics and creative gourmet entrees are all presented with a steady focus on how to identify, select and prepare foods using ecologically sound principles.

There are nearly 250 recipes for superbly seasoned, beautifully presented meals to serve for any occasion, from an intimate family dinner to a large holiday celebration.

#7515 \$19.95



LARD: COOKING WITH YOUR GRANDMOTHER'S SECRET INGREDIENT

Showing up in high-end restaurants and pastry shops, lard is once again embraced by chefs, dieticians and enlightened health care professionals. Lard; The Lost Art of Cooking with Your Grandmother's Secret Ingredient

offers you the opportunity to whip up traditional recipes and incorporate good animal fats into your diet once again. #5901 \$24.99



ONE-HOUR CHEESE

It's a DIY cook's dream come true: It's pizza night, and you've made not only the crust and sauce, but the mozzarella, too. Or, you're whipping up quesadillas for a snack, using your homemade Triple Pepper Hack. One-Hour Cheese includes

16 recipes for fresh cheeses that can be made in an hour or less, using readily available ingredients and tools. And, they'll be just as delicious as store-bought! \$14.95 #7407



COMFORT FOOD COOKBOOK

Bring tasty, old-fashioned comfort food to your table at every meal with the Comfort Food Cookbook, a collection of more than 230 recipes from the archives of *Grit*, a long-running country-lifestyle magazine. Discover how easy it is to make delicious bis-

cuits, cornbread and other classic family favorites with wholesome ingredients.

#7289 \$24.99



THE FOUR SEASON FARM GARDENER'S COOKBOOK

The Four Season Farm Gardener's Cookbook is two books in one. It's a year-round, seasonal cookbook with 120 recipes to maximize the fruits (and vegetables!) of your gardening labor. It's also a step-by-step garden guide full of easy-to-follow instruc-

tions and plans for different gardens. It covers properly sizing a garden, nourishing the soil, and the importance of rotating crops and planning ahead.

#6545 \$22.95



THE FEAST NEARBY

Within a single week in 2009, food jour nalist Robin Mather found herself on the threshold of a divorce and laid off from her job at the Chicago Tribune. Forced into a radical life change, she returned to her native rural Michigan. There, she learned to live on a limited budget while

remaining true to her culinary principles of eating well and as locally as possible. Mather's poignant, reflective narrative shares encouraging advice for aspiring locavores everywhere, and combines the virtues of kitchen thrift with the pleasures of cooking-and eating-well.

#5451 \$24.00



DRINK THE HARVEST

Preserving the harvest doesn't have to stop with jam and pickles. Drink the Harvest shows you how to create juices, ciders, wines, meads, teas and syrups to savor any time of year. From strawberry juice to pear cider, dandelion wine to spiced apple mead, citrus peel tea to

kombucha, these delicious recipes will please your palate. #7232 \$18.95



CURING & SMOKING: MADE AT HOME

Curing & Smoking demonstrates how simple it is to use the magic of smoke to create wonderfully aromatic foods with distinctive flavors. The book follows the curing and smoking processes from beginning to end, from creating a useful pantry

to storing your home-cured creations. Topics covered include drying, curing, hot smoking, cold smoking, indoor smoking, drying and wrapping, and vacuum packing.

#6215 \$19.95



HOME CHEESE MAKING

Discover 75 recipes for making your own cheese and other dairy products that require only basic techniques and the freshest of ingredients. You'll enjoy the satisfaction of turning out a coveted delicacy, and then using your homemade

cheese in the book's recipes, which include treats such as Ricotta Pancakes, Cream Cheese Muffins and more.

\$16.95 #1660



MEALS IN A JAR

Meals in a Jar provides step-by-step, detailed instructions needed to create all-natural breakfast, lunch and dinner options that you can keep on a shelf and prepare in minutes. These scrumptious recipes allow even the most inexperienced chefs to serve delicious

dishes. Not only are these meals perfect for after-school study sessions and rushed evenings, they make for tasty fare on family camping trips and can be lifesavers in times of disaster.

#6657 \$15.95



WHOLE GRAIN BAKING MADE EASY

Written by MOTHER EARTH NEWS Contributing Editor Tabitha Alterman, this book is an in-depth guide for bakers who want to maximize the nutritional value of their breads, pastries and desserts while experiment-

ing with delicious new flavors of many different whole grains and other real food ingredients. Try more than 75 recipes that are accessible yet thorough, with explanations of techniques that will not only ensure success with her recipes, but will also make you a better cook.



homesteading and livestock



POSSUM LIVING

In Possum Living: How to Live Well Without a Job and With (Almost) No Money, author Dolly Freed shares why she decided to shun the rat race and live off the land on a half-acre lot outside of Philadelphia. Originally published in the late 1970s, Possum Living is part philosophical treatise and part down-to-earth

how-to, and provides a no-nonsense approach to beating the system and becoming self-sufficient—even in suburbia. #4513 \$12.95



THE BACKYARD HOMESTEAD BOOK OF BUILDING PROJECTS

Expert woodworker Spike Carlsen offers clear, simple, fully illustrated instructions for a variety of projects, including plant supports, a clothesline, a potting bench, a

chicken coop, a hoop greenhouse, a cold frame, a beehive, a root cellar with storage bins, and an outdoor shower. Most of the projects are suitable for complete novices, and all require just basic tools and standard building materials.



FIELDS OF FARMERS

The average U.S. farmer is 60 years old, largely because young people can't get into the business, which means old people can't get out. Based on his decades of experience at Polyface Farm, Joel Salatin digs deep into the problems and solutions surrounding this land- and knowledge-

transfer crisis. Fields of Farmers empowers aspiring young farmers, midlife farmers and non-farming landlords to build regenerative, profitable agricultural enterprises. #6831



THE SHEER ECSTASY OF BEING A LUNATIC **FARMER**

Shunned by industrial farmers, vilified by corporate agribusiness, and stalked by food police as being a lunatic, farmer-entrepreneur Joel Salatin enjoys the sheer ecstasy of being

surrounded by happy, frolicking animals, dancing earthworms, and appreciative customers. This book describes the breadth and depth of the paradigm differences between healing and exploitative food systems. #4808 \$25.00

FOLKS, THIS AIN'T NORMAL

In Folks, This Ain't Normal, Joel Salatin discusses how far removed we are from the simple, sustainable joy that comes from living close to the land and the people we love. Salatin has many thoughts on what "normal"

is, and shares practical and philosophical ideas for changing our lives in small ways that have a big impact. #5743 \$25.99



COUNTRY WISDOM & KNOW-HOW

This 476-page book is a compendium of treasured knowledge from hundreds of small booklets published as "Country Wisdom Bulletins" in the 1970s. Whether you want to build a stone fence, make strawberry-rhubarb jam or

plant an herb garden, this book will explain how to make your homesteading dreams a reality.

#2793 \$19.95

To order, call toll-free 800-234-3368 (outside the United States and for customer service, call 785-274-4365), or go to www.MotherEarthNews.com/Shopping. Mention code MMEPAF42.



ALL NEW SQUARE FOOT GARDENING (2ND EDITION)

Rapidly increasing in popularity, square foot gardening is an easy way to grow a lot of food in small spaces. Rich with fullcolor images and tips for selecting materials, this book is perfect for brand-new

gardeners as well as the millions of square foot gardeners who are already dedicated to Mel Bartholomew's industrychanging insights. #6645 \$24.99



THE NEW CREATE AN OASIS WITH GREYWATER

This revised and expanded edition describes how to quickly and easily choose, build and use a simple greywater system. Some can be completed in an afternoon for less than \$30. This book also provides complete instruc-

tions for more complex installations, and describes how to deal with freezing, flooding, drought, failing septics, low-perc soil and nonindustrialized world conditions. This book helps in coordinating a team of professionals to get optimum results on high-end projects and "radical plumbing" that uses 90 percent fewer resources. #4376



DRIP IRRIGATION FOR EVERY LANDSCAPE AND ALL CLIMATES

Author Robert Kourik clearly explains how to use less water yet increase the yields of vegetables and promote the growth and flowering of all plants—trees, shrubs and container

plants—in any climate, even where it rains irregularly. This book includes information on how to manage limited water supplies with precision and efficiency, without the clutter of hundreds of widgets and gizmos. The knowledge is shared in Kourik's inimitable, friendly, down-to-earth and easy-to-understand style. #4421 \$24.95 \$13.00



GROW MORE WITH LESS

From composting and mulching to planting trees, author Vincent Simeone covers all the eco-friendly essentials in one straightforward handbook. Simeone makes the what, how and why of sustainable gardening unmistakably clear, with his advice on how to make the

best plant selections possible, manage species, conserve water with proper irrigation, install rain barrels and cisterns, and more. Grow More with Less is your complete step-by-step personal road map for green gardening. #7029 \$21.99



DESERT OR PARADISE

In Desert or Paradise, author Sepp Holzer applies his core philosophy for increasing food production, promoting the earth's health and reconnecting mankind with nature to reforestation and water conservation across the world. You'll find here a wealth of information for the gardener,

homesteader, permaculture designer and sustainable farmer. #6592 \$29.95



CREATING RAIN **GARDENS**

Homeowners spend hundreds of dollars watering their yards, but there is an easy way to save money and resources-rain gardening. This method can be as simple as collecting rain to reuse in front yards and back-

yards. Creating Rain Gardens is a comprehensive book for the DIYer, covering everything from rain barrels to simple living roofs, permeable patios, and other low-tech affordable ways to save water in the garden.



THE GARDEN PRIMER (2ND EDITION)

The most comprehensive and entertaining single-volume gardening reference ever printed now focuses on 100 percent organic methods. This updated version of Barbara Damrosch's classic guide rejuvenates the original material while main-

taining its primary appeal: practical, creative ideas and the friendly style of an "old-fashioned dirt farmer."

#3896 \$18.95



SAVING SEEDS AS IF **OUR LIVES DEPENDED**

This book offers great guidance for beginning and experienced seed savers alike on the joy and responsibility of preserving seeds. The history of seed saving comes with an overview of the current state

of seed affairs, and the endless benefits of choosing the seedy road."

#5775 \$12.00



MOTHER EARTH NEWS GUIDE TO ORGANIC GARDENING, (6TH EDITION)

It's never too early to start planning this year's garden. Where to plant your herbs? Where should your row of cabbage grow? How many tomato plants should you have? The 6th edition of

the Guide to Organic Gardening from MOTHER EARTH News is a great reference to help you plan your bountiful garden this year. Beginning with soil, fertilizer, seed starting, plant choices and so much more, this guide is 100 pages of articles to help you grow your best garden yet! #7538 \$6.99



THE YEAR-ROUND VEGETABLE GARDENER

Author Niki Jabbour gardens in Nova Scotia, where short summers and low levels of winter sunlight create the ultimate challenge for food gardeners. Her simple techniques will have you harvesting fresh vegetables in every month of the year,

no matter where you live.



GARDENING WHEN IT COUNTS

Gardening When It Counts helps you rediscover traditional low-input gardening methods to produce healthful food. This book shows that any family with access to 3,000 to 5,000 square feet of garden space can halve their food costs

using a growing system requiring just the odd bucketful of household wastewater, perhaps \$200 worth of hand tools, and about the same amount spent on supplies. #2647 \$19.95



GARDEN WISDOM & KNOW-HOW

Garden Wisdom & Know-How is a practical guide to planting and maintaining a large-scale garden. The chapters are organized by topic—garden techniques and tricks, the flower garden, the edible garden, container gardening,

garden design and landscaping, attracting wildlife, and more-and packed with useful information.

#4522 \$19.95



VERTICAL VEGETABLES

For anyone who wants to grow food in small spaces, this book has the solution: Grow up! Learn how to construct the site, prepare the soil, and plant and care for vegetables and fruit to produce big yields. From beans on a tipi and tomatoes

on a wire archway to cucumbers on a trellis and kiwis on a clothesline, author Rhonda Massingham Hart has advice to meet every gardener's needs. #5857 \$16.95



GROWING FOOD IN A SHORT SEASON

Providing helpful hints and a wise gardening philosophy for a productive food garden, author Melanie Watts begins at ground level with instructions on how to use compost and manure to create fertile soil that will

lend its life to plants. A variety of seed options and planting methods are presented-including start times and placement—that take into account microclimates that occur in each garden as well as the benefits of companion planting.



BUILDING SOILS NATURALLY

In an organic garden, plants in optimum health thrive. But if they don't, there's often something lacking in their nutri-tion. The solution is to "start with the soil," but healthy soil doesn't happen just by composting, fertilizing or companion

planting alone. This book gives gardeners a hands-on plan for creating productive, living soil by using a practi-cal, holistic approach—crafted right in your garden.





Harvard Medical School Professor John Ratey, M.D., and journalist Richard Manning investigate the power of living with awareness of our genetic makeup when making choices in the areas of diet, exercise, sleep and more. Go Wild examines how understanding our core DNA will help us combat modern disease

and psychological afflictions, from depression to diabetes to heart disease. Discount available until May 31, 2015. #7449 \$27.00 \$21.60



CONCEIVING HEALTHY BABIES

Drawing on the author's own personal triumph over infertility, Conceiving Healthy Babies is a unique herbal guide geared to help-ing couples achieve balance in preconception, pregnancy, lactation and beyond. Whether you have

experienced challenges in conceiving or just want to ensure your pregnancy is as natural and uncomplicated as possible, this book is an indispensable guide. #7327 \$19.95



500 TIME-TESTED HOME REMEDIES AND THE SCIENCE **BEHIND THEM**

Covering everything from insect bites and insomnia to nausea and stress, this authoritative and comprehensive guide offers easy recipes

to bolster your resistance to illness, and the scientific backup as to why and how the solutions are effective. It shows how to ease aches and pains and manage minor ailments naturally. The book's 500 recipes contain readily available, inexpensive and safe ingredients. #7017 \$21.99



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Circle #39; see card pg 97



Circle #76; see card pg 97



Millsmix.com is the trade name for the Beaty Fertilizer Co.

Circle #6; see card pg 97



Blast Aphids, Spider Mites and Powdery Mildew Out of Your Garden

modified watering wand is the best organic pest control that I've found! It's inexpensive, safe, easy to use, and effective for the prevention and removal of aphids, spider mites and powdery mildew. To make this tool, you'll need a watering wand and an adjustable brass hose nozzle. Both are available at any hardware store or gardening center; the watering wand costs between \$10 and \$30 and the nozzle is about \$5. Remove the shower nozzle that comes attached to the wand and replace it with the hose nozzle. If your watering wand doesn't come with a shut-off valve, you should invest in one.

Turn the water on full blast and adjust the new nozzle to create a high-pressure spray. You're dislodging the pests, not refreshing them with a shower! The angled head of the watering wand will allow you to direct the spray upward to remove pests on the underside of the

foliage. Spray from below and above to remove all pests. Do this several times a week during heavy pest season.

Be proactive about powdery mildew and wash off spores before you even see mildew. After you see mildew, you can wash it off, but you'll need to do so every day, and removal will be slow.

> Cindy Jepsen Tempe, Arizona

Research conducted at Texas A&M University has confirmed the effectiveness of this water-spray technique. Read more by going to http://goo.gl/N6BnDf. - MOTHER



Woodstove Maintenance

After 11 years of depending on a woodstove for winter heat in our Ohio cabin, we've learned to only burn hardwoods in cold months, and to never burn green wood because it creates creosote buildup in the chimney, which can cause fires. We also keep fresh batteries in all of our smoke and carbon monoxide detectors, and we check the battery levels regularly. Here are some of the tasks we make sure to perform each year:

- · Remove accumulated wood ash from inside our woodstove.
- · Check all internal and external seals and replace them if necessary.
- · Split, stack and season our wood in spring. It's a great way to lose 10 pounds for the upcoming shorts season!
- · Call our chimney sweep.

Robin Mullet Warsaw, Ohio

How to Kill Ants with Grits

If anthills are located where they cause problems, feed the ants grits. That's right-grits, the breakfast food. Sprinkle some dry grits around the anthill. The ants will eat the grits, drink some water, and then swell up and explode. You'll see results in as little as 24 hours, and entire anthills will be gone in days. Trust me; you really can kill ants with grits!

> Mitchell Whisler Twin Lake, Michigan

Reuse Yard Stakes as Plant Labels

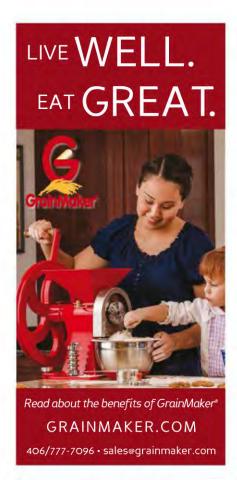
Many lawn-maintenance companies in my area place plastic stakes in the ground to notify homeowners that they visited, conducted a treatment, etc. I've found a creative way to reuse these stakes, which would otherwise be thrown away.

I collect the old plastic stakes from my neighbors and I upcycle them into DIY plant labels for my garden. Because they're designed to hold a small sign, all I have to do is create a label and insert it into a stake's existing slot. The stakes are the right length (approximately 16 inches) to stay deep enough in the ground that they don't lean. If they're too long, I can easily trim them.

> Robert J. Rhodes Suffolk, Virginia

Floating Fertilizer Gold

The invasive algae that float on ponds and lakes in southern Connecticut (near where I live) and elsewhere could make great fertilizer. My public officials want to rid us of these algal masses by either poisoning them, draining the entire lake in hopes that a winter freeze will kill them, or employing mechanical means. All of these ideas would cost taxpayers money.





Circle #71; see card pg 97

I look at these masses of floating green and see floating gold. Harvesting algae is free and easy. When I'm out in my kayak, I simply fill a laundry basket with handfuls of algae, and then take the harvest home to put on my garden. I am in the experimental stages of this idea, but I appreciate that algae are free, easy to harvest, and dry to about half of their wet mass. I believe every small farmer with a pond could harvest pond algae, dry them, fertilize a garden - and they could even sell algae at the farmers market!

> Cliff Weller Jewett City, Connecticut

The Best Thing Since Sliced Bread

If you're anything like me, you like to preslice and freeze your homemade breads in order to pull a few pieces out later. A problem with this strategy, however, is that the bread slices often stick together, and can be quite difficult to separate.

I've found a simple and inexpensive solution that really works. I tear parchment paper into pieces, and then put a sheet between the slices of bread before freezing them. Parchment paper is surprisingly sturdy and holds up well in the freezer.

In fact, the pieces can be used multiple times. Now my bread slices are always easy to take out because they haven't fused together. This is the best way to freeze bread that I've found, and the method works well for other foods, such as burger patties, too!

> Debbie Duguay Arlington, Massachusetts

Tasteful Mini-Vases for Floral Arrangements

After my grandmother passed away, my parents helped my grandpa go through his kitchen and get rid of pantry and baking ingredients he wouldn't use. I bake more than my mom does, so most of the baking items came to me. In the box my parents sent home with me, I found a half-dozen glass bottles of food coloring and extracts. I loved how dainty the bottles were, so I saved them even after they were empty.

I now use the glass bottles as minivases to display tiny floral arrangements. They're a beautiful way to remember my grandmother, a woman who enjoyed baking and crafting as much as I do.

> Courtney Denning Harrison, Ohio

A Better Way to Protect Fruit from Birds

I started wondering how to protect my fruit from birds after I noticed that they like to eat my peaches and strawberries as much as I do. Bird netting has never been effective for me, because the birds always find a way under it. With floating row cover, however, birds can't see the fruit. If they can't see it, they leave it alone.

When the fruit starts to ripen, I cover my peach tree and strawberry plants. I remove the fabric from the strawberries periodically to allow bees and other pollinators to access the bright blossoms.

My peach tree is espaliered, which makes it easy to cover. I use wooden clothespins to secure the floating row cover. As an added bonus, the cover is easy to fold up and store until I need it next season.

> Donna Enz Lyle, Washington



This peach tree is draped in row cover to hide the fruits from hungry birds.



Homemade Twine Holder

I used to be constantly irritated by trying to keep up with my jute twine balls when I tied berry bushes, flowers and other plants. I would drop the ball, or wouldn't be able to find the end, or would have a handful of "jute spaghetti."

Looking through my junk box, I found a commercial-sized pepper shaker, but it wouldn't hold the ball. My local hardware store had a roll of twine, instead of a ball, and it fit perfectly in the pepper shaker. I drilled a hole in the pepper shaker lid that was large enough to feed the twine through, but small enough to keep it from dropping back in. Now I have fun doing my tying—whether I drop it, put it in my pocket, or stick it in my belt, the twine is always there waiting for me, tangle-free!

Jim Garner North Garden, Virginia

For a nifty, ready-made twine holder that clips to your belt and includes a cutter, check out the Quick String Dispenser available at http://goo.gl/ATWtQh. — MOTHER

Sturdy Tomato Cage Design

I've designed a tomato cage that won't fall over, allows plenty of air circulation, and comes apart for easy storage and transportation. The total cost is about \$80 per cage, but keep in mind that each cage will last for years and will support three or four tomato plants.

Materials

3 pieces of concrete remesh, 42 by 84 inches, \$7 each
6 metal fence U-posts, 6 feet tall (with holes and clips), \$7 each
18 nylon heavy-duty cable ties (3 per post), about \$15 for two 15-packs

First, drive the posts into the ground in two parallel lines of three posts each. There should be 42 inches of space on either side of each row's middle post, and 42 inches of space between each row. Use the cable ties to attach the concrete remesh horizontally to the inside of the posts to form three remesh "shelves."



DIY Cold Frame

I wanted a cold frame in my tiny Zone 5 garden, but I lacked the tools, patience and space to make and store one. Instead, I stacked old bricks in a rectangle against the south-facing wall of my Illinois home. Each side is two bricks high. I purposefully sized the walls to fit three scavenged storm windows, which I laid horizontally across the top of the bricks. I prop up the glass with a stick as the weather warms. My DIY cold frame was free, it doesn't waste garden space, and it provides extra-early harvests!

Ginger Li Homewood, Illinois



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Circle #18; see card pg 97



FREE SHIPPING 6 MONTH TRIAL Call for FREE Catalog and DVD! Leave about 18 to 24 inches of height between each remesh shelf. After assembling the tomato cage, plant three or four tomato seedlings underneath the lowest tier of remesh. As the seedlings grow, each remesh shelf will lend support.

> Susan Hadden Califon, New Jersey

Hanging Herbs to Dry

As we enter the growing season and plants become readily available for harvesting and drying, this herb-drying setup will save you considerable time and space.

First, drill holes through the ends of some clothespins, and then thread a string through each hole and tie the pins to your herb-drying rack or line. Clip a bundle of herbs or flowers to each suspended clothespin. By using different lengths of string, you can vary the height of the herb bundles, which will allow for good air circulation.

> Sabrina Powers Canaan, New Hampshire

Make Every Drop Count

I was always stumped about what to do with partially depleted, 9-volt smoke detector batteries. They're usually drained enough to cause the smoke alarm to chirp (typically at 2 a.m.), but they still have some juice



Use every drop of energy from a 9-volt battery by adding it to an LED Blocklite.

left, so I hate to just recycle them. I looked around for another device to use the batteries in, such as a transistor radio, but few items use 9-volt batteries anymore.

Recently, however, I found a little LED Blocklite flashlight that does use a 9-volt battery. For about \$5, you can turn your old battery into a compact—and surprisingly bright—flashlight. Now my little light goes with me on evening walks, and it lives on my nightstand. I plan to get several more!

> Derek Purdy Sunnyvale, California

We Pay for Top Tips

Do you have handy home, farm or garden advice? We pay \$25 to \$100 for each tip we publish, plus \$25 for each photo or video we use. Send your tips to Letters@ MotherEarthNews.com.

Hatch Seeds in Upcycled Egg Cartons

I use cardboard egg cartons to start my seeds. Each egg-shaped cup in the carton is the perfect size for an individual seed-starting pot. To try this: First, cut off the lid and use it as a tray to set the pots in. Next, moisten the seed-starting mix, fill the pots with the mix, and plant a few seeds per pot. As the seeds sprout and begin to grow, cut the pots apart, thin the seedlings, and leave them in the tray under grow lights or in a sunny window until they're ready to go outside. Keep them moist!

> Jane Bell Boise, Idaho



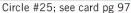
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For schedules and directions to these events, and to learn about other adoption and sale opportunities throughout the year, go to blm.gov.







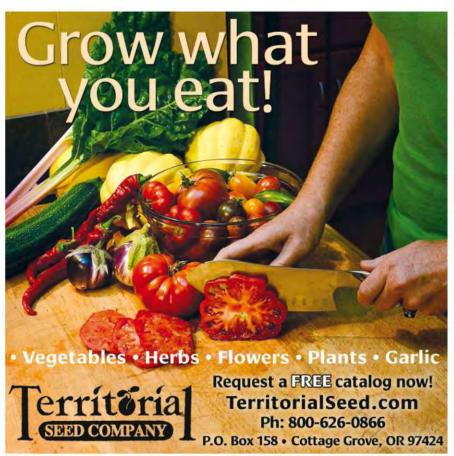


U.S. Department of the Interior Bureau of Land Management Wild Horse and Burro Program

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Circle #37; see card pg 97



Keep Track of Your Crop Rotations

Why should I rotate my garden crops? If I do, what's the best way to record what I've planted year after year?

Rotating your annual crops—even in a small-scale home garden—can help thwart potential gardening woes. If you plant the same crop in the same spot every year, overwintered pests, disease spores and nematodes can build up in that bed's soil. A lack of rotation also means that the main nutrients a crop pulls from the soil will become depleted in that spot over time.

The first step to establishing successful rotation practices is to get to know the crop families. Plants should be rotated based on family, because crops in the same family generally have similar nutrient requirements, and they also attract many of the same pests and diseases. (You can print out a chart of common garden crops, grouped by family, by going to http://goo.gl/mdwtYK.)

A good rule of thumb is to avoid planting crops that are in the same family in the same spot in your garden more often than once every three to four years. If this is tricky because of limited space or the diversity of the crops you grow, don't stress; it's merely a good ideal to shoot for. Even a two-year rotation is better than nothing.

To start keeping simple crop-rotation records, draw out your garden beds on graph paper or in a gardening notebook or journal, and fill in what you're planting where that season. You can use colored pencils to shade in planting areas based on which crop family is planted where - such as shading all tomato-family crops in red and all cabbage-family crops in green. Then, before you put any seeds or transplants in the ground the following season, sketch out a new

planting arrangement for the year. Reference the previous year's arrangement, and don't put any related crops in the same location.

Another record-keeping option is to plan your garden with MOTHER's Vegetable Garden Planner, which can track your crop rotation for you. When you draw out your garden beds on what is essentially digital graph paper, the Planner will automatically color-code your crops by family. Then, when you map out your planting arrangement the next year, the Planner will alert you if you're planning to put a crop in a place where you recently planted a crop from within the same family. To try this tool on your desktop computer, go to www.MotherEarthNews.com/Garden-Planner. If you'd prefer to plan your plot on a mobile device, try the version for iPhone or iPad, called the Grow Planner. Details are available at www.MotherEarthNews.com/Grow-Planner.

-Shelley Stonebrook



Graph your garden to ensure proper crop rotation, which deters pests and diseases.

Do Compost Accelerators Work?

I've heard that compost accelerators speed up composting and result in better compost. Are these claims true?

Most independent studies have concluded that those products aren't worth the expense. The three types of commercially marketed compost "accelerators" and "activators" are based on microorganisms, nitrogen, or herbs prescribed for biodynamic composting, and you can easily add any of those substances to your compost without spending money on a store-bought product. Dead plants, weeds, kitchen scraps and the other biodegradable wastes that go into home compost introduce all the microorganisms needed for composting to proceed. If you like the idea of adding extra microbes to keep things moving swiftly, simply add a few shovelfuls of mature compost each time you start a new heap or batch.

When a gardener adds nitrogen to a lazy compost pile, the microbes take off, and their resulting population boom produces heat, which can help an almost-finished batch to finish faster. Free or cheap nitrogen sources, such as grass clippings, poultry manure or alfalfa meal, will push a slow heap into high gear as effectively as products sold as compost activators would-and will be much less expensive, to boot.

As for herbal additions, some gardeners grow comfrey or stinging nettle to feed to their compost as "activators."

- Barbara Pleasant

What to Do About Pesticide Drift

I'm trying to garden organically, but I'm concerned about pesticide drift. How can I tell whether drift is affecting my property, and what can I do about it?

Pesticides do indeed "drift" and damage plants growing in neighboring areas. If the drifting chemical is an herbicide, then you may notice damage to plants. Loss of

Ask Our Experts



Circle #53; see card pg 97



foliage, yellowing vegetation at the wrong time of year, or damage occurring only on certain portions of plant leaves may indicate herbicide drift. Other symptoms of injury may include twisted leaves or downward-cupped leaves. However, drift from other types of pesticides may be difficult to detect. In some states, the department of agriculture will test crops for drift damage. Laboratory analysis can be costly, and it will not reveal who's responsible for the drift.

Pesticide drift also poses a threat to human health. Symptoms of acute exposure range from headaches to difficulty breathing to skin irritation. Exposure to some pesticides is also associated with long-term negative effects.

If you know you've been exposed to pesticide drift and are concerned about your health, you may want to seek medical advice. Document the problem, if possible. Then, file a report with both the National Pesticide Information Center and the lead pesticide or public health agency in your state, and press for an immediate investigation, including sampling for residues.

Pesticide drift is illegal in most states, but proving who broke the law can be difficult. To inquire about what pesticide was sprayed - and by whom - contact your state pesticide regulatory agency, which you can find at http://goo.gl/F32Qc6. Join



The Pesticide Action Network's "Drift Catcher" will monitor the air for chemical trespass.

or start a community group (formal or informal) to address pesticide drift. (Get started by networking with people in your area on the Mother Earth News state-specific Facebook pages—find yours at www. MotherEarthNews.com/Facebook. — MOTHER)

Scientists with the Pesticide Action Network (PAN) have been working with communities across the country to implement an easy-to-use, scientifically rigorous tool called the "Drift Catcher" for monitoring airborne pesticides. Contact PAN (www.PANNA.org) to learn more about this community airmonitoring device. The Drift Catcher is modeled after technology used by the California

A Better Way to Water Your Chickens

My birds make a mess of their water in no time. What kind of setup do you recommend for watering my chickens more efficiently?

Consider using watering nipples. These nifty little devices screw into holes drilled into

5-gallon buckets or other plastic containers or pipes.

The nipples release droplets of water when the birds peck at them. The vertical version must be installed into the base of a bucket or pipe, and the bucket must be hung so that the birds can reach the nipples. Horizontal side-mount nipples, on the other hand, can be mounted onto the side of a bucket (see photo at right), and thus reportedly waste less water than the vertical style.

Either of these low-cost gadgets (\$8.99 for five horizontal nipples on www.Amazon.com) will keep your birds' water much cleaner than conventional watering systems.

-Cheryl Long, Editor-in-Chief



Inexpensive watering nipples will help keep your flock's water free of debris.

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Ask Our Experts

Air Resources Board to monitor the air for pesticides. Farmers, teachers and homeowners have used the Drift Catcher to document the presence of pesticides near their farms, schools and homes, and have then wielded the data to demand policy changes.

PAN is part of an international network working to replace the use of hazardous pesticides with ecologically sound and socially just alternatives. For more about drift and how to detect it, go to www.PANNA.org/ Science/Drift.

- Emily Marquez, PAN staff scientist

Best Sources of Vitamin D

I've read that most people don't get enough vitamin D. How much do we really need, and what's the best way to get it?

A 2009 study published in The Journal of the American Medical Association found that 75 percent of adolescents and adults in the United States have insufficient levels of "the sunshine vitamin" in their blood. Our bodies convert the sun's ultraviolet rays to vitamin D, but because many of us work mostly indoors—and often apply sunscreen when we do spend prolonged time outside-our exposure to vitamin D-producing rays is low.

In 2010, the Institute of Medicine increased its official recommended daily dietary allowance for vitamin D from 200 international units (IU) to 600 IU. Some experts, however, think our daily intake should be much higher. The Vitamin D Council recommends 5,000 IU per day for

Before eating them, use mushrooms as sun sponges to reap a rich dose of vitamin D.

adults-more than eight times higher than the official recommended daily allowance.

So why do we need this nutrient? Vitamin D is commonly associated with bone health because it helps the gut absorb calcium, which is the building block for strong bones. Vitamin D also activates genes that regulate the immune system, and a growing body of research suggests this important nutrient plays a role in the prevention of colon, prostate and breast cancers; high blood pressure; and diabetes. Seasonal Affective Disorder—which often strikes during winter, the darkest time of the year - has also been linked to low levels of vitamin D.

Most people are able to meet at least some of their vitamin D needs through exposure to sunlight. The amount of time needed in the sun varies greatly from person to person, and the variables include skin type, the amount of skin exposed, your age, the time of day and the season. Aim to find a balance between soaking up vitamin D-rich rays and protecting your skin from sun damage.

Stacked up against the sun's rays, most foods aren't rich sources of vitamin D-but mushrooms are an exception. When exposed to sunlight for a day or two (but no longer), their vitamin D levels soar from about 100 IU per 100 grams up to an incredible 46,000 IU per 100 grams! So, before you cook your mushrooms, give them their day in the sun. You can also take a cue from the mushroom experts at Fungi Perfecti and make a mushroom-based "sunshine" pill at home. Find step-by-step instructions at http://goo.gl/idSz8T.

If you can't spend time outside and don't eat mushrooms, consider a vitamin D supplement. Two types of vitamin D supplements are available over the counter: D3 and D2. The D3 supplements are superior, because our bodies naturally produce D3 and are more receptive to absorbing and retaining it.

- Hannah Kincaid

Stumped about something in your home or on your homestead? Email your questions to AskOurExperts@ MotherEarthNews.com, or write to Ask Our Experts; Mother Earth News; 1503 SW 42nd St.; Topeka, KS 66609. We'll answer as many of them as we can here.





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(CONTINUED FROM PAGE 8)

that are doing well and have been doing well

So don't you dare try to tell me and others who are dependent on Tyson for our living—whether we work for Tyson or for small businesses that rely on Tyson employees coming in and spending their paychecks locally-that we destroy small towns. We build our small towns.

> Heather Rauschenberger Green Forest, Arkansas

The article's author, Christopher Leonard, responds: "I thank Heather for her comments, for her attention to the article, and for her dedication to the great town of Green Forest. I respectfully disagree with some of her assessment. The photos in the article are representative of Tyson Foods' presence throughout the rural United States, as well as of many downtown commercial areas where economic activity is anemic. Creating more competition in the meat industry to curtail the monopolistic power of Tyson Foods would foster more economic opportunity in small towns, such as Green Forest, and it would allow communities to keep more of the wealth they generate."

Don't Let That Whey Get Away

I liked the project "Do-It-Yourself Drying Rack" in the February/March 2015 issue. I



want to suggest that when people hang their homemade cheese to drain from the rack and place it over the sink, that they catch the whey. I save the whey from my homemade cheese to pour on my garden and flower beds. It's never a lot at one time, but every bit of fertilizer helps.

Whey also works great to soak whole grains in until soft, and to feed to meat chickens for a couple of weeks before processing (provided you can keep the ducks out of it).

> Richard Patterson Neodesha, Kansas

A Call for Greater Cultural Diversity

Mother Earth News encourages ingenuity and rethinking one's life-it gets people to look beyond economic and social snobbery, and to share hard work and bounty with neighbors. This is an attitude everyone needs to be exposed to, and I think Mother Earth News' embodiment of it is why your readers come from all sorts of religious backgrounds and all points on the political spectrum.

A Comfy, Cozy Cat Nap

The instructions from Elizabeth Atia in "The Purr-fect Homemade Cat Bed" (Country Lore, October/November 2014) were so easy to follow. I only made a few changes, using an old long-sleeved shirt instead of a sweater, and substituting polyfill stuffing in the arms of the shirt (the outer edge of the bed). All the bed needed was a little catnip to entice Amelia to curl up. It's been less than a week since I made it, and it has already become a popular napping spot!

> Courtney Denning Cincinnati, Ohio





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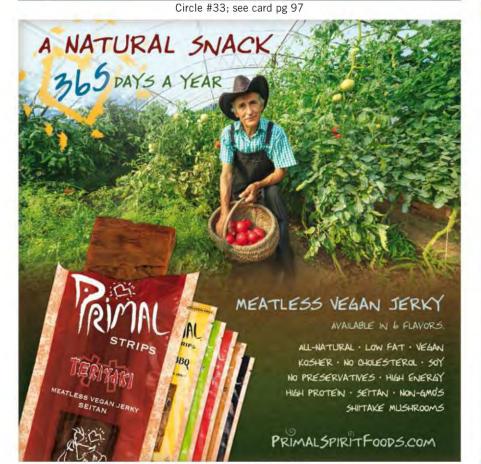
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Circle #64; see card pg 97

We have to spread the notion of approaching people as unique individuals each and every time, regardless of anything like ethnicity, appearance, education or economic status.

That said, how about more ethnic variety in your articles and photos? What does an Asian woman who survived a war choose to grow in her garden? How did an African-American woman live through the Depression and manage to establish a scholarship with her earnings? What led a Hispanic man to eventually buy the apple orchard that he started working on as a migrant laborer, and how did he keep it going while other orchards were being swallowed up by development?

You need to give us more racial and social diversity in your stories—not just because it's the right thing to do, but because, as a reader, I want to know their strategies, too!

> Julia Jackson Seattle, Washington

Pushing for Better Farm Policy

Once again, Joel Salatin blew me away with his insight on rejecting industrial agriculture in favor of forward-thinking, sustainable pro-

MOTHER'S Wish List

Find our contact info on Page 98. Garden carts. Do you have a favorite style or brand of garden cart or wheelbarrow? Or have you found a clever or unusual use for your cart? We welcome your suggestions, ideas and photos. Seed-starting options. What's worked best for you? We'd love to see photos or plans of your home seed-starting setup. Homestead hamlets. Is your neighborhood working to pool resources, live more sustainably and establish strong bonds? Maybe you're gardening together on nearby empty lots, building a coop to raise chickens, installing a neighborhood nest of beehives, or going in together on a wind turbine? We want to know! We're looking for leads on what we call "homestead hamlets" (see http://goo.gl/xc5aK3 for an example) for an upcoming article.

Pastured meat, egg and dairy producers. We invite you to take part in our nutrient-testing program. Get all the details at http://goo.gl/6x56BB.

duction in his article "A New-Fashioned Food System" (December 2014/January 2015).

Maybe Joel could provide readers with a sample letter that we could use as a basis for communicating with our elected officials about developing farm policy that supports this new, better way of feeding the world?

> Jeanne DeValeria Pittsburgh, Pennsylvania

Thank you for the suggestion, Jeanne. Joel has decided to write his column for the next issue on this very topic, so stay tuned - MOTHER

Steps Toward a Sustainable Population

Thank you for referencing our precedent-setting report "What is an Optimum/Sustainable Population for Vermont?" in "Go, Vermont!" (Green Gazette, October/November 2014). I was surprised to see the critical response to it in the letter "Concerned in Vermont" (Dear MOTHER, February/March 2015).

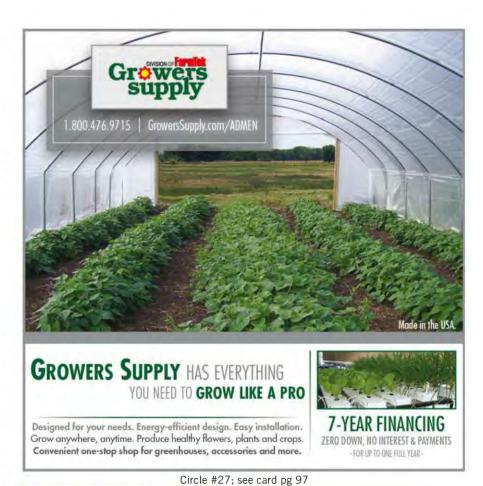
Vermonters for a Sustainable Population is not a "lobbying group," as was suggested. Our mission is to inform Vermont's citizens about the negative impacts that continued population growth will have on the environment, the economy, and the quality of life of future generations. We also aim to motivate Vermonters to take actions that will help achieve a sustainable population. We are one of only three states that have a state-level population organization, the others being California and Florida.

Despite what some say, we cannot have infinite growth on a finite planet. How about environmental leaders in other states working together to make their own projections on what would be an optimum, sustainable population for their states?

> George Plumb Executive Director Vermonters for a Sustainable Population Washington, Vermont

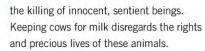
Defending Dairy Animals

I'd like to comment on your article "Keep a Family Cow to Enjoy Delicious Milk, Cream, Cheese and More" (June/July 2010). Cows form strong emotional bonds with their calves, and it's very painful for the mother cow to have her baby stolen. The entire process of using cows for dairy products involves









Nancy Poznak Owings Mills, Maryland

Ethical Eating: Be Mindful and Humble

In the February/March 2015 issue's Dear MOTHER section, reader April Ford asked for a discussion on the ethics of eating meat. From my perspective, the most common reason people choose to be vegetarian is that they don't want to kill animals. Unfortunately, there is no way to eat without killing animals and other living beings.

Vegetarians get much of their protein from beans, peas and other legumes, which are annual crops that require tilling of the soil. Animals such as rabbits, snakes, mice, moles and voles live in fields and are killed by plowing. Tilling also kills ants, earthworms, night crawlers, earwigs, beetles and all kinds of underground critters, and it disrupts the soil ecosystem. To ignore the deaths of all of these living beings is to dishonor them.

I believe eating grass-fed meat that's raised on untilled pasture is an ethical choice. Grass evolved in partnership with bison, elk, deer, cows, goats and other grass-eaters. When we eat the grass-eaters, we honor our part in this ancient symbiosis. Humans are not separate from the cycle of eating and dying, so let's be humbly mindful when we eat.

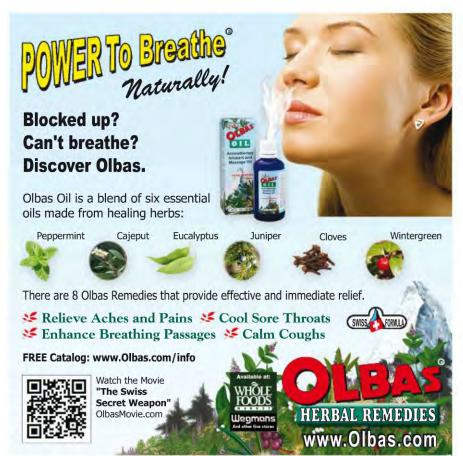
> Celeste Lemire London, Ontario

Android, Please

I would really love if you would make your apps available for Android devices as well. Like so many other readers, I have an Android tablet and smartphone. I'd like to be able to use these apps, but I can't.

> Stephanie Ford via www.MotherEarthNews.com

Great news, Android users! Our most popular app, When to Plant, is now available in an Android version just in time for prime planting season. Simply plug your ZIP code into this app, and it will give you location-specific planting dates for dozens of vegetables, herbs, fruits, cover crops and more. Find it on Google Play as well as in the Apple App Store, and learn more about the app at



Circle #58; see card pg 97

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A Positive Difference

Wow. I just love Mother Earth News! I was only recently introduced with the December 2014/January 2015 issue, and I hope more people catch on soon, too.

The articles about fossil fuel divestment and B Corporations, as well as Joel Salatin's "A New-Fashioned Food System," are really meaningful. We need this information to preserve this planet and to pass it on to future generations. Your reports on the high costs of factory-farmed meat and anything pertaining to solar power are educational and inspirational for those of us who want to make a positive difference. As a young man, I look forward to finding ways to contribute and sharing ideas with like-minded people.

> Dan Biddle Thompson, Ohio

Seed-Saving Success

In response to the article "Saving Seeds: 7 Reasons Why and Dozens of Tips for How" (December 2012/January 2013): I love the regional adaptation aspect of saving seeds, and I've found that the benefits can become apparent rather quickly.

I'm only an amateur gardener, but I saved some peas from my 2013 plants and grew them last year, along with some of the seeds from the original package. The peas that came from the saved seeds grew twice as fast, and they produced more than double what the ones from the package did! I had no idea plants' adaptive qualities could be so evident in just one generation. This is the most compelling reason for me to save my own seeds-and it's also pretty fun!

> Courtney McFarland Laguna Niguel, California

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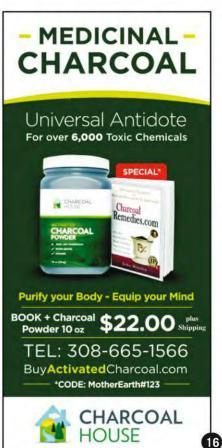


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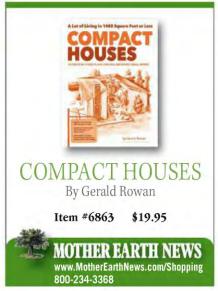


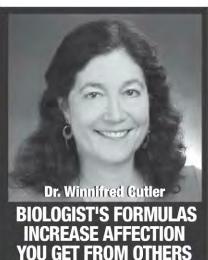


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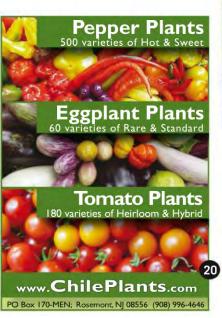
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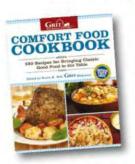








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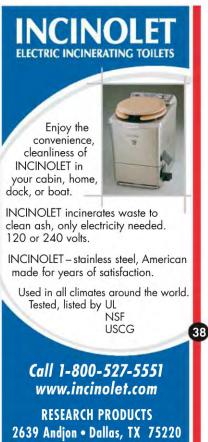


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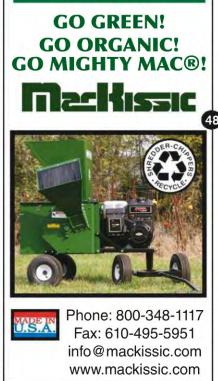
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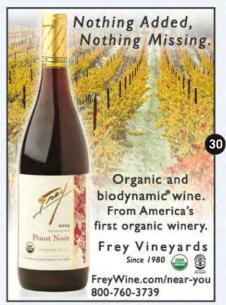
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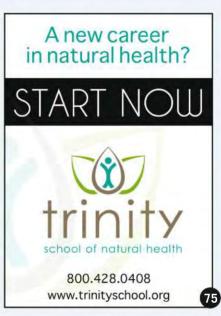
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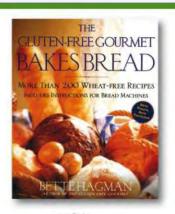












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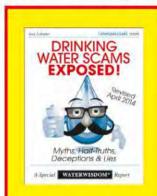
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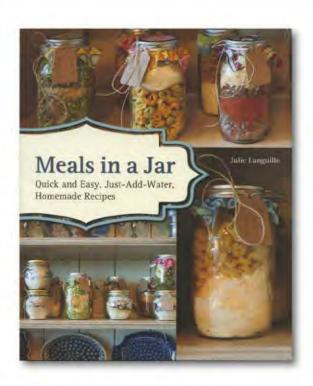
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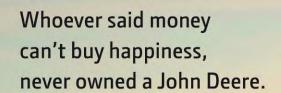




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